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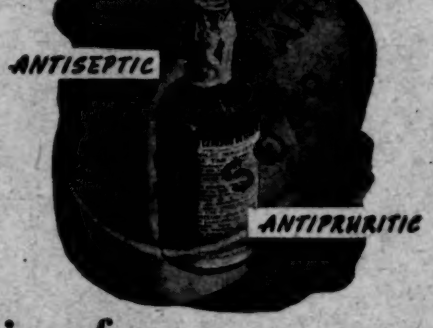

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 3 1945

THE AETIOLOGY OF GALL-STONES*

BY

Sir JAMES WALTON, K.C.V.O., M.S., F.R.C.S.

Surgeon to the London Hospital

In spite of an enormous amount of clinical, experimental, and theoretical work the cause and methods of formation of gall-stones, upon which diagnosis and treatment must be based, have been fogged by the fact that all types of stone have been considered together, whereas there are several distinct types.

Cholesterol Stones

A pure cholesterol stone is single, oval in shape, up to 1-1/2-1 in. in its long diameter, nodular on the surface, semitransparent and waxy in appearance, light yellow in colour, and on section is amorphous in its outer layers but in the centre may show radiating crystals. If pure it is a light yellow (A 5),† but it may be tinted with bile (6). There is a variety which contains a certain amount of calcium, probably in the form of biliverdin or bilirubin calcium (7 B, C). In this case there are usually several stones.

Like all gall-stones the cholesterol stone is more common in women—the proportion being about 2.5 to 1—and some 80% of the women are married and have children. It is known that the function of the gall-bladder is to concentrate the bile to about one-tenth of its volume. There is a condition, generally known as a strawberry gall-bladder, which, on the apices of the papillary folds, shows masses of cholesterol or a lipoid substance (37) that has been believed to be due to the deposition on or the absorption by the mucosa of cholesterol from a supersaturated solution. It is known that the blood cholesterol is increased in pregnancy, and this type of gall-bladder may be found in pregnancy and in eclampsia (38), and may even progress to the stage of forming papillary masses (39) which might separate to produce cholesterol stones.

For these reasons it has been believed by many—and especially by Aschoff and Bacmeister, who claimed that such stones could occur in gall-bladders entirely devoid of any inflammatory change—that these stones were metabolic. This has been accepted, almost without question, by many physicians, who argue that in many women the cholesterol is increased by pregnancy, and later by overeating and lethargy so that they are often over-weight, and that the gall-bladder concentrates the cholesterol and, the bile acids being reduced, the cholesterol is deposited from solution.

Nevertheless I am convinced that these arguments are fallacious. Sight is lost of the fact that the common age for gall-stones in women is 40 to 60, and of the total female population of this age, whether suffering from gall-stones or not, some 80% are married with children. Stones are rarely formed in the ducts, but when they are they consist of bile pigment and not of cholesterol, as they should be if deposited from a supersaturated solution, and this is true even in cases of obstruction of the duct by carcinoma of the pancreas or chronic pancreatitis. In such cases the bile is concentrated to a profound degree, so that it forms a tarry fluid which may be opaque to *x* rays, but pure cholesterol stones are then never found even in the gall-bladder. They are formed in the gall-bladder either when it is entirely cut off from the bile stream by the stone obstructing the duct (16) or in the distal cavity of an hour-glass gall-bladder (18). No bile is present, and therefore the stones cannot be deposited from a supersaturated bile. They are never laid down as a primary crystalline mass, as they should be if deposited from a supersaturated solution, but are amorphous, although they may undergo secondary crystalline changes in the centre. They are completely insoluble in ether or olive oil although cholesterol crystals are freely soluble in such, but if they are finely crushed so that the organic matrix is broken up they become soluble. Therefore attempts which are sometimes made to remove small stones from the ducts by washing them out with ether are based on incorrect knowledge and are ineffective. In my own experience every cholesterol stone has been associated with cholecystitis, in some cases purulent (4). Therefore these stones are certainly not metabolic, but are formed by an inflamed gall-bladder.

Pigment Stones

Pure biliverdin calculi form small irregular friable masses of so dark a green that they are nearly black (9). They may be formed in the ducts or be found in the gall-bladder, and in the latter case may become coated with cholesterol (10); but this never happens in the ducts. The pure bilirubin stones are soft putty-like masses of a dark-brown colour. They may be found in relatively large cylindrical masses in the common duct in cases of cholangitis. If a mixed stone has passed down and become impacted in the common duct it may become covered with a layer of bilirubin, but the presence of a laminated centre will be proof that it originated in the gall-bladder. If such a stone is found after a cholecystectomy it must have been overlooked at the first operation, for a newly formed stone would consist of pigment throughout. They may also occur in the intrahepatic ducts, and are often deposited when there is a long-continued obstruction of the ducts and greatly concentrated bile. Like the biliverdin variety they may, if present in the gall-bladder, be coated with cholesterol (12 D). It is the pigment calculi which are found with extensive blood destruction—e.g., acholuric jaundice, malaria, etc. They are easily soluble and therefore often stain the mounting fluid. After removal of the cause they may become absorbed, even if in part covered with cholesterol in the gall-bladder, but in this case the pigment is alone dissolved and the cholesterol is untouched (22). They are therefore certainly metabolic in origin and due to deposition from a supersaturated solution.

Mixed Stones

These are often known as common gall-stones and they may be single or multiple. In the former case they may fill the gall-bladder and are oval in shape, with a surface that is nodular or mammillated from the impression of the mucosal folds (H). If the stone be large enough to obstruct the duct the portion in the duct will remain pigmented, but the greater mass in the gall-bladder will become coated with cholesterol and resemble a pure cholesterol calculus (16, 17). It is this large single stone which is most prone to ulcerate through the fundus into the duodenum, where it becomes coated with intestinal contents and may cause acute intestinal obstruction. If multiple they may be few and large (15), often then forming a chain of barrel-shaped stones filling the gall-bladder, or multiple even up to several hundreds, and may be loose or so numerous that they form a tight mosaic filling the gall-bladder (44). When multiple they are nearly always faceted, either because they fit into one another as they increase in size or because they rub upon each

* Presidential Address to the Medical Society of London, delivered on Oct. 8, 1945.

† The numbers in parenthesis refer to the List of Specimens given at the end of the paper.

other. They may be stained with biliverdin (E) or bilirubin (F), but in any one case the stones are all of one colour, although Bland-Sutton stated that the bile in herbivorous animals was red and in carnivorous animals green, and suggested that the colour might be dependent upon the diet. If few in number they are often of the same size, and it has therefore been suggested that they are all formed at one time (Rous) or that they may be grouped into several sizes and thus might be formed at a few critical periods (Lichtman); but in my experience they are most commonly of all sizes and might therefore be constantly forming. In my opinion there is little or no evidence that they are formed as the result of one transient episode.

One of their most marked characteristics is that they are laminated on section. In the centre the laminae may consist of radiating crystals, but the external layers are always amorphous. The different laminae may vary in colour but are usually alike. Like pure cholesterol stones they are insoluble in ether or olive oil unless crushed, and they have an organic matrix.

It is on the method of formation of these calculi that there has been so much controversy, the following views being held:

(a) Stagnation of Bile

This was one of the earliest theories of the cause of gall-stones (Galen, Frerichs, Rokitansky, Aschoff and Bacmeister, etc.), and is still supported in many recent monographs and textbooks of medicine. It is believed that stasis without infection could lead to the precipitation of bile salts and cholesterol—a view that was considerably strengthened by the knowledge that in the gall-bladder the bile was concentrated to one-tenth of its volume. Stasis was believed to be more common in women because they wore corsets (but gall-stones have not become less frequent since tight lacing has been abandoned); because of the pressure from the pregnant uterus and later from the development of ptosis (but although the symptoms of ptosis may resemble those of gall-stones the two conditions are rarely found together); and because of their sedentary habits. Gall-stones, however, may be found in thin and active people. The supporters of this view have even blamed the wearing of a belt in men as a cause, but in most men the position of a belt has no relation to the position of the gall-bladder. The main argument against stasis being a causative factor is that this type of stone never occurs in conditions of profound stasis such as obstruction of the common duct—that, in fact, they are never formed in the ducts at all, and are not deposited as crystals, but are always amorphous, with an organic basis, and therefore are insoluble in ether and olive oil. As Robertson says: "Stasis, so useful in the laboratory test-tube experiment, is not the cause of gall-stones." Newman is more emphatic when he states that "stasis in itself is no explanation for anything."

(b) Metabolic Changes

In 1789 de Fourcroy discovered cholesterol and showed that it was a constituent of gall-stones. Since then many observers have claimed that cholesterol is increased in the blood during pregnancy, but it is not evident that this affected the cholesterol content of the bile. It was later shown that the removal of bile salts from the bile led to precipitation of the cholesterol, and Thudichum believed that fermentation of the bile caused a splitting of the bile acids and alkalis and so led to a precipitation of the cholesterol. The same arguments are as true here as in the case of pure cholesterol stones. They are never formed in the ducts, however concentrated the bile; they are never deposited as crystals; but, later, radiating crystals may be formed in the centre, and they are insoluble. It seems certain, therefore, that they are not due to deposition owing to metabolic changes.

(c) Constitutional Susceptibility

Several cases in my own practice have had a *family history*. In particular one girl of 18 whose bladder was full of stones had eight immediate relatives, including both parents and two grandparents, who had had gall-stones; but such a history is unusual. Stress has been laid upon the presence of a hereditary physical constitution (Draper), but most observers (Chauffard, Howard, Tucker, Bauer) have failed to obtain evidence in support of his conclusions. Even if a family history is obtained it is always possible, as in other diseases, that it might be due to a similar environment.

Association with Urinary Calculi.—The association of the two conditions has been believed in from very early times, but Robertson could find no evidence to support it, and states that the number of patients who harbour both types of stone has not proved large enough to justify the belief. Nevertheless in a series of cases I investigated and reported over 30 years ago 80% of the patients with gall-stones had *B. coli* in their urine.

Association with Diabetes.—Many statistics have been published in support of the view that biliary calculi and diabetes were frequently associated. Bouchard found gall-stones in 10% of diabetics, and Jones places the incidence as high as 22%; but Naunyn and Kausch state that the combination is uncommon. Robertson in his masterly review‡ reports the results of 4,761 necropsies in patients over 20; 3,016 were males and 1,745 females. Gall-stones were present in 22% (500 men and 532 women). Diabetes was present in 205 of the total of 4,761. Of these, 76 (37%) had gall-stones, while of the 4,556 non-diabetics 956 (21%) had gall-stones. It is very probable, however, that the gall-stones have given rise to a pancreatitis and so caused the diabetes; for, as Robertson says, in nearly all cases the symptoms of gall-stones precede those of diabetes, and diabetes is not the cause of gall-stones.

Excessive Weight.—There is a general belief that gall-stones are more common in fat women, and that idleness, lethargy, and overeating are the cause of increased cholesterol formation and the development of gall-stones. The experience at my own hospital supports the view that they are more common in fat Jewesses. Nevertheless it has been shown that there is very little evidence that increase of cholesterol in the blood is the cause of cholelithiasis, and stones often occur in thin people. Although Dublin, Gross, and Joslin, among others, have produced statistical evidence that sufferers from gall-stones are usually over weight, Robertson found in his 1,032 cases with gall-stones that 578 (56%) were of normal or subnormal weight. Even if they are more common in fat patients there is no more evidence that the fat caused the gall-stones than that the stones caused the fat.

Other Diseases.—Arteriosclerosis, gout, and tuberculosis have all been described as predisposing causes, but there is no evidence of any such relationship.

(d) Neurogenic Dysfunction

In recent years, when so much stress has been laid upon the nervous basis of disease, it is but natural that a neurogenic origin should be suggested for gall-stones. Westphal has perhaps been the strongest supporter of this view: he was able to demonstrate contractions of the gall-bladder with expulsion of the bile after mild irritation of the vagus, and relaxation with dilatation of the gall-bladder after stimulation of the splanchnic or sympathetic nerves. He and others claimed that in pregnancy a distension of this type occurred. This is, however, merely a variant of the theory of stasis, and the proof that such a dilatation, if present, is the cause of gall-stones is entirely wanting.

(e) Infection

The three main arguments against stasis and the metabolic origin of these and of pure cholesterol stones are that cholesterol is never laid down in the ducts; that it is deposited in the amorphous and never in the crystalline state; and that the stones are insoluble. Naunyn first asserted that cholesterol was not derived from the bile but was secreted by the epithelial cells of the gall-bladder and that cholesterosis of the bladder was similarly due to this secretion and not to absorption from the bile. He also showed that the newly deposited material was amorphous and not crystalline, and that there was always evidence of inflammation of the gall-bladder. Later he claimed that the *B. coli* was always present. Mignot pointed out that the infection was always chronic, and this indeed was to be expected, for in an acute infection of short duration, as revealed by operation or at necropsy, no stone would have had time to be formed.

It is of interest to note that even Hippocrates and Galen recognized the possibility of an organic basis, but it was not until 1684 that v. Heyde was able to extract the crystalline material from a urinary calculus and leave an organic basis. Ord laid stress upon the presence of a colloid, and Wells described what is now a well-recognized physical phenomenon—that crystalloids concentrate around the globules of a colloid, a process known as adsorption. There was at first a difficulty in accepting this explanation; for the colloid was believed to be mucus, but many failed to find it in the mucosa of the gall-bladder. Later Policard showed that the inflamed cells could take over the function of producing mucus. Many, however, regarded it simply as a binding or cement; but whereas the physical process of adsorption—where the crystalloid is deposited upon the surface of the globules of an irreversible colloid, probably owing to changes in surface tension—gives a ready explanation of the insolubility of a gall-stone in solvents of cholesterol, the mere presence of a cement does not.

Many have believed (Herxheimer, Collinson, etc.) that the presence of a nucleus was of prime importance, as there is a tendency for both colloids and crystalloids to precipitate around a central core. The nucleus is believed to be formed of clumps of bacteria, which

‡ *The Preponderance of Gallstones in Women.* H. E. Robertson. *Int. Abs. Surg.*, **80**, No. 1, Jan., 1945, p. 1.

were first demonstrated by Gallippe, epithelial cells, or duct concretions. Moynihan's statement that every gall-stone is the tombstone of a dead bacterium has now become classical. Some have raised the objection that experimental or critical investigations have failed to demonstrate a nucleus, but the occasional presence of a silk suture (57) or a dead intestinal worm is a nucleus that is plain for all to see. It must be clearly understood that there is not a simple deposition of crystals around the nucleus but a process of adsorption.

The nature of the infection that leads to the secretion of mucin and cholesterol is probably very variable. When typhoid fever was endemic acute cholecystitis was common, and every surgeon is conversant with cases where gall-stones have followed typhoid. The patient is a typhoid carrier with *B. typhosus* in the stools, and after removal of the inflamed gall-bladder and stones (43) no more bacilli are passed and he ceases to be infectious. Although many writers have refused to accept the view of infection there can be no doubt that it is present in such cases. Hanot, and later Deaver, laid much stress upon the presence of the *B. typhosus*. Welsh has shown that coccal infections may act in a similar manner, and the work of Gordon-Taylor and Whitby demonstrating the presence of *B. coli* is known to you all. The greater liability of women to a systemic *B. coli* infection, especially during pregnancy, may account for their increased tendency to develop gall-stones.

Another factor upon which discussion has centred is the laminated structure of these stones. Many have compared them with other animal concretions, such as pearls, which have a similar organic matrix, or with mineral materials such as agates (1), or even with the world itself, and have regarded them as examples of the universal tendency in nature for the formation of alternating deposits of a different character; but the pure cholesterol stone does not show such lamination. The simple explanation, however, would seem to be that at times the stone obstructs the cystic duct so that pure cholesterol secreted by the bladder-wall can alone be laid down, while at other times the duct is free, bile can enter, and layers containing pigment are formed.

It would appear, therefore, to be beyond question that the stones are inflammatory in origin. Reacting to infection, the gall-bladder secretes the colloid mucin and the crystalloid cholesterol; a nucleus is formed of bacteria, epithelial cells, or, rarely, of a foreign body. If there be but one nucleus the stone is single, if multiple there are many stones. The crystalloid is deposited upon the colloid globules in an amorphous form by a process of adsorption, but later undergoes a secondary crystallization. If the cystic duct is permanently obstructed a pure cholesterol stone is formed (J), but if the obstruction is intermittent it is laminated. If the stones are multiple they are faceted either as they fit into one another as they are formed or by friction one against another. As the colloid is irreversible they cannot be dissolved or dispersed by any method of treatment.

Paths of Infection.—The next question that has given rise to controversy is the manner by which the infection reaches the gall-bladder. It was at first natural to assume that it passed up the duct from the intestine. Every surgeon, however, is aware of the fact that in the majority of cases of either acute or chronic cholecystitis the duct shows no sign of infection, and that when an infection is present a stone, laminated like those in the gall-bladder from the presence of cholesterol and which must therefore have been formed in the gall-bladder, is found in the duct. If its presence in the duct has caused a cholangitis a new layer is formed on the stone, but this always consists of pure bile pigment and never contains cholesterol. Moreover, there is an increasing volume of evidence that infection of any organ of the body—stomach, kidney, bladder, pancreas, etc.—rarely enters by the natural path or duct. It would seem that the protection against infection by this path is so efficient that it seldom breaks down. Moreover, stones rarely form when there is a partial obstruction and stasis in the duct such as occurs with carcinoma or chronic pancreatitis. This freedom of infection of the duct is evident from the fact that nearly all patients with gall-stones are completely cured by cholecystectomy.

The view that organisms might be absorbed from the intestinal wall into the portal vein and be excreted in the bile was attractive, for such organisms would very likely have an attenuated virulence and thus would more probably cause a chronic cholecystitis; but here again an infection of the ducts, the liver, and the portal vein would be evident, but it is generally absent.

A certain amount of evidence has been produced that the infection may spread directly or by means of the lymphatics from the liver, and Graham has pointed out that in nearly all cases there is some fibrosis of the adjacent liver; but it would appear more probable that the inflammatory change has spread from the gall-bladder, for it is limited to the area in close proximity to the gall-bladder and is never widespread in the liver.

Many investigators have been struck by the fact that in the presence of gall-stones the bile was often sterile. At first it was believed that the organisms, having initiated the formation of the stones, had died out and were present, either alive or dead, only in the centre of the stones. Since then much work has been done showing that even if the bile is sterile organisms can be obtained from the gall-bladder wall. It is necessary to refer only to that of Illingworth and Wilkie, who obtained streptococci in this position, and of Gordon-Taylor and Whitby, who isolated the *B. coli*. The experimental work of Mann showing that the injection of formalin into the lateral ear vein of a rabbit was shortly followed by an acute cholecystitis seemed to prove that an infection could also take place through the systemic circulation. The claims of Rosenow, that his work demonstrated so marked a specificity of organisms that those removed from an infected gall-bladder and injected into the peripheral blood stream of an animal would in the majority of cases produce a cholecystitis, were attractive from this point of view. Many pathological specimens would support this idea. Specimen 43 is an example of a typhoid cholecystitis from a typhoid carrier in which there is gross fibrosis of the wall but only small calculi, suggesting that the primary infection must have been in the gall-bladder wall. Specimens of intramural calculi where the stones are in the mucosal crypts in the wall but none are present in the cavity (40, 40a, 40b), and of calculus formation around a silk suture in the fundus of the gall-bladder, are very suggestive (57).

One is therefore led to the conclusion that not only are these stones due to an infection, but this infection is carried to the gall-bladder wall through the systemic circulation.

Calcium Carbonate Stones

The most interesting stones, and the kind most difficult of explanation, are those formed of pure calcium carbonate. In the fascinating book *Gall-stones*, written by the late Sir John Bland-Sutton in the early years of this century, the author states that he knew of only two such cases, but since then I have been able to collect five from my own practice, which are now in the museum of the London Hospital. They may occur in two forms, one of which consists of well-formed extremely hard calculi that are spherical, with a nodular surface. They are generally small and relatively few in number (19), but in one remarkable specimen (20) there were 11 stones in the gall-bladder and 28 in the common duct. The yellowish-white colour and the nodular appearance give them a close resemblance to pigment stones which have become covered with cholesterol in the gall-bladder. In fact, in the specimen I so mistook them until I attempted to cut one to demonstrate the pigment centre and broke a piece out of the knife. The other variety consists not of a formed stone but of a thick white paste resembling unset plaster-of-Paris, which may fill the gall-bladder (21) and have embedded in it one or two mixed gall-stones. Specimen 21a is an example. The pure calcium carbonate gives, of course, a deep *x*-ray shadow, and in this case the cavity of the gall-bladder was well outlined as though dye had been administered, with two negative shadows due to the stones. When it was known that no dye had been given the diagnosis was certain.

The reason for the formation of these rare stones is very difficult to understand. Elsewhere in the body the deposition of calcium carbonate is indicative of a very slow and chronic inflammation of connective tissue, and hence it would be expected that the gall-bladder would show a very chronic change, with destruction of the mucosa; but although this is true of calcification of the gall-bladder wall it is not the case with calcium carbonate stones. In one specimen (24) a typical deposit of soft material was formed in a case of alcholuric jaundice where pure pigment stones would have been expected. In none of my cases was there any evidence of hyperparathyroidism. At present I must confess that I have no explanation to offer for this unusual phenomenon.

Conclusion

I trust that I have been able to show that there is still much of interest to be learnt from the everyday experiences of surgery, and that to those of a curious and inquiring mind there are still big fields of research in the observations of gross pathology.

LIST OF SPECIMENS REFERRED TO IN THE TEXT

A 5. Pure cholesterol stones.
6. Pigmented cholesterol stone.
7, B, C. „ „ „ with calcium carbonate.
37. Strawberry gall-bladder.
38. „ „ „ in eclampsia.
39. „ „ „ with papillary masses.
16, 17. Cholesterol covering stones, with obstructed duct.
18. Cholesterol covering stones in distal pouch of hour-glass gall-bladder.

4. Cholesterol stone associated with acute purulent cholecystitis.
9. Pure biliverdin stones.
10. „ „ „ coated with cholesterol.
12, D. Bilirubin stones coated with cholesterol.
22. Partly absorbed stones.
H. Large single stone in gall-bladder.
15. Barrel-shaped stones.
44. Mosaic of gall-stones in gall-bladder.
E. Multiple-faceted biliverdin stones.
F. „ „ bilirubin „
43. Typhoid cholecystitis.
1. Agate showing lamination.
J. Laminated stone covered with cholesterol.
40, 40a, 40b. Intramural calculi.
57. Recurrent stones formed round silk sutures.
19. Small calcium carbonate stones.
20. Large „ „ „
21. Putty-like mass of calcium carbonate.
21a. „ „ „ „ „ „ with common stones.
24. „ „ „ „ „ „ from case of acholuric jaundice.

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THEIR PROBABLE RELATION TO BRACHIAL PLEXUS PRESSURE BY NORMAL FIRST RIBS

BY

F. M. R. WALSHE, M.D., D.Sc., F.R.C.P.

During the past four years I have seen an unusual number of cases in which the presenting symptoms have been numbness, tingling, and "uselessness" of the hands and fingers in women, often associated with severe pain and a variable degree of disability. By the time such patients reach the neurologist they have usually been given prolonged, various, and largely ineffective treatments. It is improbable that my experience in this matter is unique, but since there is clearly general uncertainty as to the aetiology and nature of the condition and as to the means of dealing with it effectively, a short account and some suggestions as to its causation may not be amiss.

I have said that the patients are women, but the incidence of the syndrome may be still further restricted. The sufferers fall into two main categories. The most numerous are middle-aged or elderly women, normally unaccustomed to full housework or other forms of manual effort, who, under wartime circumstances, have been obliged to undertake the entire work of their homes with all that this involves in the preparing of food and meals, cleaning, shopping, standing in queues, and the carrying of heavy shopping baskets. The second category is composed of younger women who, in addition to the not light tasks enumerated, have also done part-time work in industry, or have had the burden of childbirth and the care of young children.

In both categories the history has the following characteristic features. The symptoms have been gradual in onset and consist of intense sensations of numbness and tingling in hands and digits. These are greatest on waking in the morning, when they make the fingers clumsy and weak. By the time the patient has dressed, the symptoms have lessened and hands and fingers regain much of their dexterity. Nevertheless, they remain uncomfortable and less than normally nimble all day, and in the evening, when the major burden of the day's work is over, the symptoms increase again. During the night pain and paraesthesiae in the fingers may awake the patient, the pain being of a burning character. The subject may have to adopt various measures to secure relief: getting up and walking about, putting the arms over the edge of the bed, or placing them upon the pillow above her head. In yet other instances the night is the period of relief. An unusually hard day's work aggravates the symptoms, while such tasks as ironing, washing, and the carrying of heavy baskets are especially provocative of severe accesses of pain and numbness.

After some weeks or months the symptom-complex reaches its maximum, and thereafter fluctuates in severity and disabling quality from patient to patient. It varies also from time to time according to the patient's general health and state of fatigue. Pregnancy and the care of the child after confinement undoubtedly aggravate the condition.

The response to the treatments commonly adopted is uniformly disappointing, for whatever the mode of therapy the patient is commonly expected to remain ambulant and to follow her normal routine of life. The sage maxims of Hilton in the matter of rest are forgotten, and find an ineffective substitute in injections of vitamin B_1, the oral administration of vitamin combinations, and diverse forms of physiotherapy. The patient is treated by what is thought to be science, and certainly not by anything that can be called the art of medicine. In middle-aged women, of course, the oestrogens are invoked with no fruit, and when the desperate patient has sought relief from practitioners not on the *Medical Register* "manipulation of the spine" has still further added to her torments.

A few of the sufferers have discovered for themselves that a rest or holiday affords remarkable relief, but the fact provides a clue that no one is interested to follow to its logical conclusion—namely, that it suggests a mechanical origin of the syndrome.

On examination the subject is commonly found to show the general indications of chronic fatigue, and indeed the sense of fatigue may be one of her bitterest complaints. The musculature is atonic; often the shoulder girdles are set notably low, so that the line of the clavicle as this is followed out from the sternal end is almost if not quite horizontal. It is known that this state of affairs—a progressive lowering of the shoulder girdle—is the rule in women as middle age is reached and passed, and it is therefore not always clear that this sagging is beyond the limits of the normal; but my own impression is that this is commonly so in these cases. In a proportion of them traction on the dependent arm obliterates the radial pulse, though this is not constant, and may indeed be found in persons who are symptomless.

There is no muscular wasting, but almost always marked tenderness of the extensor muscles in the forearm, and sometimes of the thenar and adductor muscles of the thumb. Objective sensory loss is exceptional, though when pain and paraesthesiae are maximal there may be some blunting of cutaneous sensibility over the digits. Cyanosis or pallor of the fingers is occasional, but Raynaud's syndrome is no essential part of the picture. The pain and discomfort and the muscle tenderness may lead to some apparent weakness of grasp and to notable clumsiness of finger movements. Radiography reveals no abnormality except the lowering of the outer end of the clavicle already alluded to, but of course an occasional case of cervical rib is revealed in this way.

In brief, the condition is one in which subjective symptoms predominate or exist alone and objective signs are scanty.

The syndrome is not unfamiliar to clinicians, but what is new is its widespread incidence. Formerly confined to women habitually doing heavy work, such as washerwomen, it is now found throughout the social scale. One other point may be made at this juncture, in anticipation of what is to be said of treatment—namely, that the symptoms characteristically respond to rest, but not to any other modes of treatment unless rest accompanies them, when it may be suggested that they are superfluous and inoperative.

Aetiology

The condition thus briefly described is the one familiar to us under the uninformative title of "acroparaesthesia." In textbooks of medicine it finds cursory mention among vascular diseases and is described as a vasomotor neurosis—a meaningless term that is nowhere defined, and one for the use of which no reasons are offered. Authors stress the absence of objective signs, and agree that it is bilateral and common in middle-aged women, in debilitated subjects, and—by way of a parting shot—in those who are emotionally unstable.

Treatment is generally allowed to be unsatisfactory, and includes radiant heat, massage, ionization, diathermy, thyroid extract, calcium of course, bromides, salicylates, and vitamins. Not one of these remedies but has been described as useless by some writers, valuable by others. No one can doubt that the syndrome will shortly be conscripted into the swelling ranks of so-called psychosomatic disorders, from which it will with difficulty be rescued for medicine proper.

It is now often diagnosed as polyneuritis or, when it is seen in or immediately after pregnancy, as the polyneuritis of pregnancy, and it is in these circumstances made the subject of recondite speculations as to the metabolic disorders and vitamin deficiencies of this state. It may be doubted whether polyneuritis is in question at all. Multiple symmetrical peripheral neuritis, to give it its full name, has certain constant objective signs which include paresis, loss of tendon-jerks, sensory loss, and a distribution involving all four limbs, the lower limbs being the most severely affected. We know nothing of a polyneuritis affecting the upper limbs alone and unaccompanied by the objective signs enumerated. In short, the syndrome of acroparaesthesia does not come in this category at all and cannot rightly be labelled "polyneuritis."

When we not only survey the signs and symptoms of acroparaesthesia but consider also the factors of general health which accompany its appearance, we find that the factors common to all cases are fatigue and debility and the heavy use of the arms and hands. There is no evidence that pregnancy *per se*—that is, as a state associated with metabolic or toxaemic disorders—is a causative factor, but like debility and asthenia it is an added physical burden to an already overworked woman. In short, the incidence of acroparaesthesia among women may be related to a simpler and less speculative factor than these; namely, to an anatomical factor—the topographical relation of shoulder girdle to upper thoracic outlet.

In a recent paper on rib-pressure syndromes in association with cervical, rudimentary, and normal first thoracic ribs (Walshe, Harvey Jackson, and Wyburn-Mason, 1945) the authors make a passing reference to the syndrome which is the subject of the present paper and suggest that this also is a rib-pressure syndrome, the rib in this case being a normal first rib. Rib-pressure syndromes fall into two categories: those in which the upper thoracic outlet is abnormal from the presence of a rudimentary seventh cervical or first thoracic rib, and those in which the operative factor is an altered relationship between the shoulder girdle and a normal upper thoracic outlet. This last is the category now in question.

The components of all rib-pressure syndromes are nervous and vascular, and in the individual case either or both may be present. Reasons are given in the paper referred to for thinking that the vascular symptoms are invariably due to interference with the flow of blood through the subclavian artery, either as it crosses the edge of the thoracic outlet or by compression in certain positions of the arm between clavicle and thoracic outlet. The nervous symptoms are similarly caused; and here also, contrary to what has been commonly believed, the elements of the brachial plexus involved may be caught between the arms of the vice formed by clavicle and rim of the thoracic outlet. Costo-clavicular compression of the subclavian artery and vein has been fully discussed in an earlier paper by Falconer and Weddell (1943), but these authors did not consider whether nervous structures might also be affected in this way.

It is not germane to the purpose of this paper to describe the major symptoms that may ensue in cases of normal first-rib pressure. These are fully discussed in the paper by the three authors already referred to. What is here submitted is that traction and compression of the lower trunk of the brachial plexus and possibly also of the subclavian artery are the essential mechanical factors underlying most, if perhaps not all, cases of acroparaesthesia in women, that these factors are caused by sagging of the shoulder girdle, and this, in turn, is a natural consequence of an atonic supporting musculature. In the group of cases under consideration the traction and compression are minimal, capable of producing pain, tingling, and numbness, and at times some cyanosis of the digits with coldness, but not adequate to produce the graver nervous or vascular disorders. Whereas rib-pressure syndromes due to an abnormal upper thoracic outlet (rudimentary cervical or first thoracic rib) are usually unilateral, because the thoracic outlet in these cases is commonly asymmetrical, the minor normal first-rib-pressure syndromes are bilateral, because here the thoracic outlet is symmetrical and the sagging of the shoulder girdles—being dependent upon a general muscular atonia—is also bilateral. If the symptoms are more marked on one side this is commonly the right, the right hand and arm being the more constantly and heavily used.

We have, in short, a simple mechanical factor capable of producing the characteristic syndrome of acroparaesthesia, and corresponding in its incidence to the clinical group in which the syndrome is found—namely, the debilitated, atonic, and fatigued woman, either middle-aged or recently recovering from illness or childbirth.

The temptation to find a single pathology for a well-defined clinical syndrome is a strong one, and may often be fallacious, as we have recently seen in the sweeping and unsubstantiated doctrine that all cases of sciatica are due to herniated intervertebral disks. Nevertheless we may regard the mechanical factors that have been described here as probably accounting for the great majority of cases of acroparaesthesia in women, and as factors to be excluded before more recondite and speculative aetiologies, metabolic and dietary, are invoked. It should be added that this view of the aetiology of acroparaesthesia has been expressed by other writers in the past, notably by Wartenberg (1936, 1944), and is therefore not here advanced as original, but rather because current modes of treatment show it to be generally unfamiliar to clinicians. The remedy proposed by Wartenberg, however—namely, division of scalenus anterior—is not recommended, as being unnecessary and, when performed, usually fruitless.

Treatment

If, as has been postulated, we are dealing with a mechanically produced "neuritis" of components of the brachial plexus, sometimes with an associated minimal interference with the blood supply to the upper limb, it might be expected that rest—either rest in bed or the simple cessation of manual work—would produce appreciable relief and final disappearance of symptoms. That this does in fact occur is the submission of this paper. It is further submitted that rest is the only effective treatment. The majority of the numerous patients who have come under my own observation have, as already stated, been given prolonged and sometimes heavy dosage with synthetic vitamin B_1, as well as various forms of physiotherapy. When these procedures have not been accompanied by rest they have, in my experience, proved futile, and this also is what might be anticipated if the view as to aetiology taken here is the correct one.

No one is better aware than I that to advise rest from routine housework may often be an impracticable counsel of perfection. Nevertheless if this be the essence of treatment it is important that we should realize it. We have to face the reality of the situation and to avoid putting ourselves in a false position by advising measures of treatment that are invariably ineffective; and that they are so the accounts of acroparaesthesia in the textbooks, as well as personal experience, must have convinced most of us.

In the most severe cases, therefore, an initial period of a week in bed, propped up during the day, with the arms in slings and taken out only for feeding and other necessary purposes, is the most rapidly effective way of securing relief from pain; thereafter a longer period of abstention from heavy housework, and the supporting of the arms in slings whenever possible while the patient is standing or walking. During this second period massage to the shoulder girdles and general tonic treatment tend to prevent recurrence. Analgesics also have their uses in some cases as an adjuvant. If these things can be achieved, other modes of treatment have no value. To ply these unfortunate women with vitamin B_1 is as irrational as to sacrifice a goat to Aesculapius or to send them forth upon a healing pilgrimage to Epidauros.

Summary

The common and well-defined syndrome that goes by the name of acroparaesthesia and is recognized as peculiar to women patients engaged in manual work, when they are debilitated or fatigued, and usually when they are in middle age, is considered as a manifestation of a rib-pressure syndrome. The rib in question is the normal first rib, and traction and compression are exerted on the lower components of the brachial plexus, and sometimes also upon the subclavian artery, when from muscular atonia the muscles supporting the shoulder girdles allow these to droop and sit at an abnormally low level. In short, acroparaesthesia is a mechanically produced syndrome. There is no evidence available for regarding it as dependent upon abnormalities of metabolism—either toxaemic or due to dietary deficiency—or as standing in any specific relation to pregnancy *per se*.

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I have said that the patients are women, but the incidence of the syndrome may be still further restricted. The sufferers fall into two main categories. The most numerous are middle-aged or elderly women, normally unaccustomed to full housework or other forms of manual effort, who, under wartime circumstances, have been obliged to undertake the entire work of their homes with all that this involves in the preparing of food and meals, cleaning, shopping, standing in queues, and the carrying of heavy shopping baskets. The second category is composed of younger women who, in addition to the not light tasks enumerated, have also done part-time work in industry, or have had the burden of childbirth and the care of young children.

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Summary

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The essential treatment is rest for the limbs. No other treatment is essential, or useful when given without rest. If there be other causes of this familiar syndrome their operation has not so far been demonstrated.

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MISSED CASES OF INFECTIVE HEPATITIS*

EVIDENCE OF LIVER DAMAGE WITHOUT SYMPTOMS AMONG A COMMUNITY AT RISK

BY

M. R. POLLOCK, M.B., B.Ch.

There is a widespread conviction that many cases of infective hepatitis fail to be recognized either because jaundice never develops or because symptoms are so slight that the patient does not seek medical advice. Cases with typical symptoms and abnormal liver function tests but no jaundice are well known to occur, although there is difference of opinion as to their frequency. This problem has been discussed in a separate paper (Pollock, 1945). In many of these so-called "subicteric" cases —particularly among children, in whom the disease is known to be generally milder than in adults—symptoms are minimal; and even in cases that do develop jaundice there are reports of this being the first or only symptom of the attack. Where jaundice occurs the case will not often be missed, whether other symptoms develop or not, but if by any chance it were possible for infection to occur in the absence both of jaundice and of subjective symptoms, the case would almost certainly be missed even under close medical supervision. Such persons would fall into the category of subclinical "ambulant cases" and, although themselves suffering no inconvenience, might be just as capable of transmitting the disease as a fully developed case. Ideally they would be detected by isolation of the infective agent or by specific serological tests; but unfortunately this is not yet practicable. If, however, subclinical infection were associated with some degree of liver damage it might be possible, by the use of a sensitive test of liver function, to obtain suggestive evidence by investigating a section of a community exposed to risk. Hallgren (1943) has reported raised serum bilirubin values among contacts during an epidemic in a sanatorium, but in view of the wide individual variation known to occur in serum bilirubin concentration it is uncertain how much significance should be attached to his results. In any case, the possibility of liver damage occurring in the absence of symptoms was considered of sufficient epidemiological importance to merit the present investigation.

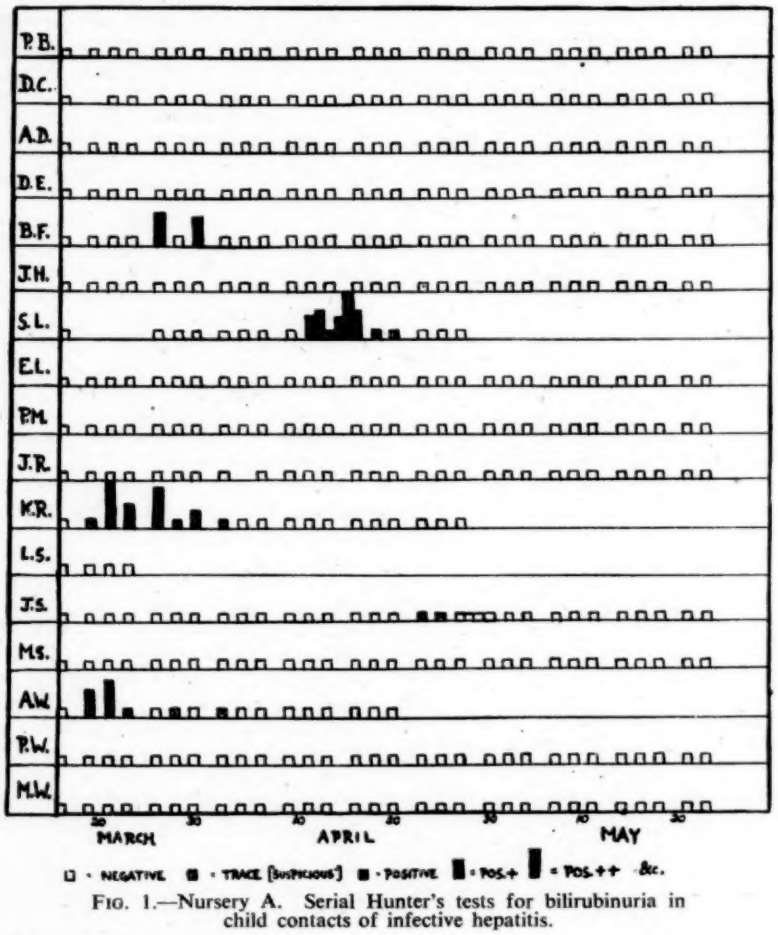

FIG. 1.—Nursery A. Serial Hunter's tests for bilirubinuria in child contacts of infective hepatitis.

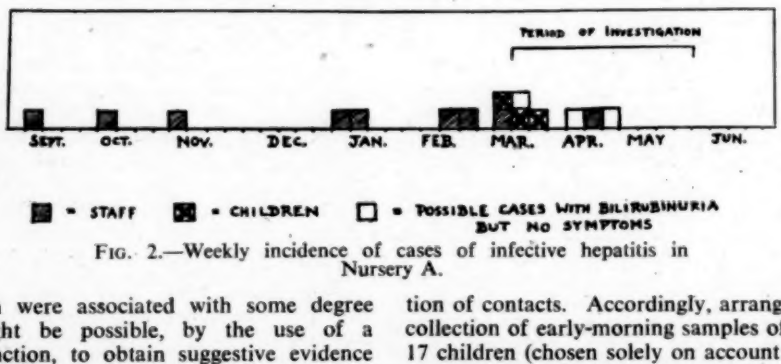
PERIOD OF INVESTIGATION
SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN.
▩ = STAFF ▩ = CHILDREN □ = POSSIBLE CASES WITH BILIRUBINURIA BUT NO SYMPTOMS

FIG. 2.—Weekly incidence of cases of infective hepatitis in Nursery A.

Methods

For the continued investigation of large numbers of contacts during an epidemic it was necessary to choose a simple liver function test which could be rapidly performed and easily repeated. For this purpose the detection of small quantities of bilirubin in urine by the sensitive method described by Hunter (1930) was considered most suitable. Work (Pollock, 1945; Gellis and Stokes, 1945) on the pre-icteric stage has shown that bilirubin appears in the urine early in the disease, before the serum bilirubin starts to rise, and the test had been found consistently negative in a large series of healthy persons.

The technique of the test and method of collection of samples were slightly modified (Pollock, 1945) in order to increase the sensitivity and allow specimens to be kept for 2 to 3 days before analysis without undergoing deterioration.

Results

A good opportunity for testing contacts occurred at the beginning of 1945 in a residential nursery (Nursery A) for children from 2 to 5 years old. Cases of infective hepatitis had been occurring singly or in pairs among members of the staff at approximately monthly intervals since September of the previous year. The place was excellently run and the standard of hygiene and nursing was high. There was a fairly large turnover of staff, both domestic helps and student nurses, but the population of children (total about 35) remained fairly constant. There was little direct contact between children and the outside population, apart from occasional visits of parents.

On March 11 one of the children (P.H.) became ill and developed jaundice 6 days later. This was the first known case among the children, and it was decided that this would be the most suitable time to begin a mass investigation of contacts. Accordingly, arrangements were made for the collection of early-morning samples of urine thrice weekly from 17 children (chosen solely on account of their reliability in providing specimens). The investigation went on continuously for 10 weeks, although by this time 4 of the children had left.

* A report to the Medical Research Council.

All but 2 were tested for at least 6 weeks. The results are summarized in Fig. 1. It can be seen that altogether 5 children developed bilirubinuria during the course of the investigation, and in 4 cases tests were positive on more than one occasion. As soon as a suspicious or positive result occurred the child was isolated and kept in bed until 3 successive negative tests had been obtained. A detailed summary of findings in all positive cases is given in the accompanying Table. Unfortunately, in only two instances was it possible to collect blood for the estimation of serum bilirubin. It must be pointed out that the degree of bilirubinuria was relatively slight, since Hunter's test is a great deal more sensitive than most other urine tests for bilirubin, a +++ result corresponding roughly to a just-positive iodine ring test. None of the children ever developed jaundice, but K.R. would probably have been recognized as a "subicteric case," since he was passing very obviously dark urine and had a well-defined clinical attack.

Summary of Findings in those Children in Nursery A who showed Positive Hunter's Tests during the Investigation

Name	Age	Date of First Positive Hunter's Test	Serum Bilirubin		Remarks
			Date	Mg./100 c.cm.	
A.W.	4½	March 19	—	—	No symptoms March 21: Liver not felt; no abdominal tenderness
K.R.	4	,, 21	March 21	0·8 (Direct van den Bergh reaction: positive)	March 20: lethargic; anorexia March 21: Vomited; liver not felt; slight tenderness R. hypochondrium
B.F.	4	,, 26	,, 28	0·4	March 28: nausea and vomiting. T. 100°. Liver not felt; no abdominal tenderness
S.L.	2½	April 11	—	—	No symptoms April 12: T. 100° April 15: Urine "dark"; liver definitely enlarged and slightly tender
J.S.	5	,, 23	—	—	No symptoms April 25: Liver palpable but not enlarged; no abdominal tenderness

The only child of those being investigated who developed any symptoms without bilirubinuria was P.B., who vomited once on the night of March 31; her temperature was normal and she was perfectly well the next day. Six other children, not in the series, vomited each on one occasion during the period of the investigation; Hunter's tests, performed the following day, were all negative, and with one exception—a boy who developed a temperature of 101.4° and was not well for about a week—recovery was almost immediate. Vomiting is, of course, not infrequently encountered in children of this age, and it is difficult to ascribe much significance to this symptom alone.

It is thus possible to say that suggestive evidence of liver damage and therefore of infection with the agent of infective hepatitis (known to be present in the community) was obtained in 3 cases in the absence of significant symptoms. The most striking cases were S.L. and A.W., both of whom gave repeated unequivocal positive tests over a period of several days without ever developing symptoms. It is unlikely that either would in the ordinary way have been suspected as possible cases, although S.L. was noticed to have passed dark urine on one occasion 4 days after the first positive test; her temperature would not have been taken had she not been under suspicion because of her bilirubinuria, since she appeared perfectly well. In one other case (B.F.) considerable bilirubinuria occurred two days before the onset of symptoms, and in K.R. a suspicious result was obtained one day before the onset.

The sequence of cases in the epidemic is shown in Fig. 2. If all the children who developed bilirubinuria are included as possible cases, it is likely that A.W., K.R., and B.F. were infected at the same time as the first-reported child victim (P.H.)—presumably by one of the two staff cases that occurred in February—and that S.L. and J.S. were secondarily infected from them. The time of occurrence of the symptomless "cases" is consistent with the known incubation period of 20 to 40 days. No further cases of jaundice have occurred in this nursery up to the beginning of October (5 months after the end of the investigation).

Controls

It was considered advisable to investigate under identical conditions similar communities who had not been exposed to any source of infection for several months. Thirty-two children in two other residential nurseries where there had been no record of jaundice among either staff or children for at least 12 months were therefore tested approximately thrice weekly over periods up to 4 weeks. In 4 isolated cases in one of these nurseries suspicious traces of bilirubin were found, although, so far as was known, all the children were well; but there was no positive result out of a total of 302 tests.

Discussion

It must be admitted that these findings have been obtained in very young children, and at the best remain only suggestive. It is possible that efforts to obtain similar results among an adult community would not be successful. It might also be argued that the children were too young to be capable of complaining of slight subjective symptoms which would certainly be commented upon by adults. But the fact remains that definite bilirubinuria occurred among apparently healthy members of a community exposed to the risk of infection, and such bilirubinuria was not present to any significant extent in similar communities not so exposed. It therefore appears possible that infection with the virus of infective hepatitis may be unrecognized even when special efforts to detect cases are made under close medical supervision.

Summary

Suggestive evidence of symptomless attacks of infective hepatitis among a community of young children exposed to risk of infection has been obtained by the repeated use of Hunter's test for bilirubinuria.

My special thanks are due to Dr. G. Hamilton Hogben, medical officer of health for the borough of Tottenham, and to Miss Moody, matron of Tottenham Residential Nursery, Bengeo, Hertford, without whose willing and efficient co-operation this investigation would not have been possible; also to the matrons and staffs of the nurseries at Abberley House, Shelford, and Kensal House, West Wratting, who most generously helped in collecting control specimens from children under their care.

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AMPUTATIONS, RE-AMPUTATIONS, AND PENICILLIN

BY

E. N. CALLUM, F.R.C.S.Ed.

Senior Surgeon and Deputy Medical Superintendent, St. Helier County Hospital, Carshalton; Late Senior Surgeon, Ministry of Pensions Hospital, Chapel Allerton, Leeds

This communication is based on some 102 amputations and re-amputations, 90 of which were performed during a 6-months period at the Ministry of Pensions Hospital, Chapel Allerton, Leeds. There were 19 primary amputations and 83 re-amputations; amputations of digits and trimming operations on soft tissues are not included.

Twelve cases operated on previously to the 6-months period were selected as cases which would have been suitable for post-operative penicillin had it been available. The majority of the 83 re-amputations were performed on patients whose original amputations had been carried out under active-service conditions, where the primary consideration was to save life. All the re-amputations were necessary for limb-fitting purposes. Some of these, however, had undergone primary amputations in ideal hospital conditions, only to be subjected to re-amputation because the original stumps were unsuitable for the fitting of artificial limbs. The reason for this is probably the retention in most textbooks of operative surgery of descriptions of classical amputations which should be revered for their antiquity rather than practised by surgeons. An invaluable book on the

subject is *Amputations and Artificial Limbs*, by Kelhan and Perkins (Oxford University Press). The operation is not merely the removal of a diseased or mutilated limb, but the first step towards supplying the patient with an artificial limb. As was pointed out by Mr. St. Clair Strange at a meeting of the British Orthopaedic Association (reported in the *Journal*, Jan. 13, 1945, p. 56), the amputation stump is a new and normal organ, upon the perfection of which depend the subsequent health and happiness of the patient.

Careful operative technique, with particular attention to haemostasis, will amply repay the patience and trouble expended. In many cases sepsis in an amputation stump follows haematoma formation, and this can be avoided only by careful technique. Except in extreme urgency, to aim at speed in amputations is folly, and is a relic of the pre-anaesthetic era of surgery. The important points are: (i) snugly fitting anterior and posterior flaps; (ii) avoidance of lateral flaps; (iii) meticulous attention to haemostasis; (iv) drainage for a limited time, usually 24 to 48 hours; (v) careful post-operative bandaging and early stump movements.

It has been stated by Mr. Strange (loc. cit.), quite correctly, that a re-amputation should be approached in the same spirit as, for example, a bone graft, and that adequate time must be allowed after the healing of the original wound sepsis before embarking on the operation. There is, however, an additional important factor with which this paper is concerned—namely, the effect on the patient of prolonged hospital treatment and lack of a limb. Many septic stumps take a very considerable time to heal, only to be re-amputated before an artificial limb can be fitted. The effect of all this is bad for the morale of the patient, besides being a serious economic handicap to himself and the State—delaying as it does his reinstatement as a useful member of the community.

Results with Post-operative Penicillin

For these reasons we have, in certain cases, been performing re-amputations with the help of post-operative penicillin before the original wound had healed, or when it had only just healed. In many of these cases the wounds were of the type that "looked as if they would never heal"—to quote a nursing sister. In none of these cases was operation undertaken in the presence of obviously active inflammation or profuse discharge, and in all cases but one (in which healing was considerably delayed) the organisms present in the discharge were predominantly penicillin-sensitive. In other cases post-operative penicillin has been used on account of a past history of severe infection or of the presence of bone disease, and in these cases operation has been undertaken earlier than would otherwise have been feasible.

The first series (Series A) comprises 34 cases treated with post-operative penicillin, locally in all cases, and in a few instances by the systemic route as well. The local penicillin was administered by means of small-bore rubber tubing with lateral holes, stitched across the wound and coming out at each corner, the flaps being accurately and firmly sutured together. The dosage in most cases was 5,000 units twice daily for 5 days in the case of local therapy, while the systemic course was 15,000 units every 3 hours, also for 5 days, by intramuscular injection. The remaining 68 cases were in the nature of controls, and did not receive penicillin. 47 of these cases (Series B) were "clean," and could, on general surgical principles, be considered safe for operation. The remaining 21 cases (Series C) were more doubtful, and were of the type which would probably have benefited from post-operative penicillin if available.

The results are shown in Tables I to IV. To give an indication of the progress of cases the average periods have been calculated (in weeks approximately) between the time of wounding and the time when first measurements were taken for artificial limbs, and again between the time of the amputation or re-amputation under consideration and first limb-fitting action. This latter time-period gives a very fair indication of the success of the operations under consideration in the three series.

In Table I it will be seen that in Series A these average times are 35½ and 10 weeks respectively. In Series B they are 29½ and 7 weeks; while in Series C they are 35 and 21 weeks. In this last series it should be noted that 8 cases are still unhealed, so that the average times of healing would really be considerably higher if these had not been omitted from the calculation. There were no such failures in the penicillin series (A) or in the "clean" series (B); while the failures in Series C comprise 38.5% of that series, which contained cases very similar to those in Series A. In this paper an amputation is considered to be a failure if the stump remains unhealed for a long period or if re-amputation has to be performed before limb-fitting is possible.

TABLE I.—*Analysis of All Cases*

Series	No. of Cases	Average Time Wounding to Limb-fitting	Average Time Operation to Limb-fitting	Delayed Healing (No. and %)	Unhealed (No. and %)
Series A	34	35½ weeks	10 weeks	3 (8·8%)	Nil
Series B	47	29½ "	7 "	0	0
Series C:					
(*a*) Relative success	13	35 "	21 "	11 (84·6%)	
(*b*) Still unhealed	8				8 (38·5%)
(*a* and *b*)	21				
Series B and C combined (unhealed cases excluded)	60	31 "	10 "	11 (18·3%)	0
Series A, B, and C (unhealed cases excluded)	94	33 "	10 "	14 (14%)	0
Unhealed cases	8				8 (8% of all cases)

Of 90 cases operated on at this hospital during 6 months all have been measured for artificial limbs. Six of the 8 cases still unhealed and 1 of the cases of delayed healing were transferred to this hospital from elsewhere after operation.

Table II gives an analysis of cases in Series A, with types of case operated on and some other details. Where more than three months had elapsed between operation and limb-fitting the cases were considered as instances of delayed healing. It may be noted that only 3 such cases occurred out of 34—that is, 8.8%.

TABLE II.—*Analysis of Series A (Cases receiving Post-operative Penicillin)*

Type of Case	No. of Cases	Details	Average Time Operation to Limb-fitting
Open wounds:			
Successful	16	Penicillin-sensitivity positive in all cases; 3 cases with protrusion of bone	9 weeks
Delayed healing	2	Both below knee; one developed haematoma, one became septic	20 "
Failures	0		
Bone involved:			
Successful	5	One case with protrusion of bone, 4 with osteitis or osteomyelitis	11 "
Failures	0		
Prophylactic penicillin:			
Successful	9	Past history of severe infection	9½ "
Failures	0		
Recently healed stumps:			
Successful	1	Past history of infection	7 "
Delayed healing	1	Above-knee; developed eczema of stump after healing	18½ "
Failures	0		
All types:			
Successful	31		9½ "
Delayed healing	3		16½ "
All cases included	34		10 "
Failures	0		

Percentage of delayed healing, 8·8 (3 out of 34). Best average results were when the penicillin-sensitivity tests were positive.

Table III provides details of cases in Series C, for comparison with Table II. It is obvious that the results in Series A were very much better than those in Series C, although both series contained similar types of case. Even with the 8 failures left out of account, the average time between operation and limb-fitting was 21 weeks in Series C, as compared with 10 weeks in Series A. It is not too much to claim that the difference in these results is due to the use of post-operative penicillin.

In considering cases of delayed healing in Series A and C it is of interest to note that in at least three instances trouble started with haematoma formation, and in one case the penicillin-sensitivity test was negative.

TABLE III.—*Analysis of Series C (Infected, Non-penicillin)*

Type of Case		No. of Cases	Average Time Wounding to Limb-fitting	Average Time Operation to Limb-fitting
Open wounds still present at operation	Healed ..	5	41 weeks	20½ weeks
	Unhealed ..	2		
Infected cases*	Healed ..	5	32 ,,	21 ,,
	Unhealed ..	6		
Other factors present†	Healed ..	3	35 ,,	21 ,,
	Unhealed ..	0		
All cases ..	Healed ..	13	35 ,,	21 ,,
	Unhealed ..	8		

* Those with a history of severe infection of the wound.
† One case had a Charcot ankle, one had foreign bodies in the stump, and the third had had an ulcerated leg for years before amputation was undertaken.

Table IV gives details of the 90 cases operated on during a 6-months period, with comparisons between cases receiving

TABLE IV.—*Comparison of Results at Various Amputation Sites (in 90 Cases during 6-months Period)*

Site of Amputation or Re-amputation	Penicillin Series		Control Series		All Cases Combined	
	No. of Cases	Average Time Operation to Limb-fitting	No. of Cases	Average Time Operation to Limb-fitting	No. of Cases	Average Time Operation to Limb-fitting
Above elbow	2	10½ weeks	6	9 weeks	8	9½ weeks
Below elbow ..	2	11 ,,	10	5½ ,,	12	6½ ,,
Above knee ..	19	9 ,,	11	7½ ,,	30	8½ ,,
Below knee ..	11	12 ,,	29	12 ,,	40	12 ,,

and those not receiving post-operative penicillin. The results are given for the various amputation sites. It should be noted that the most difficult site to obtain a good result is below the knee, all but 2 of the 12 cases of delayed healing being below-knee amputations.

Conclusions

The best indications of the success of an amputation or re-amputation are: first, the shortness of time between operation and readiness of the stump for limb-fitting; secondly, the subsequent behaviour of the stump under the strain of wearing an artificial limb. Time alone can show the latter, but the former can be worked out quite easily and gives a reasonable index of the degree of success. It may be added that a rapidly healing stump is usually sounder than a slowly healing one.

Broadly speaking, these series give us the results in 3 types of case. First, potentially or actually infected cases receiving post-operative penicillin; secondly, uninfected cases not receiving penicillin; and, thirdly, potentially or actually infected cases not receiving post-operative penicillin. It is evident that in the uninfected cases the results were best, but they were only slightly better than in the infected cases receiving post-operative penicillin; the relevant average times of healing were 7 and 10 weeks respectively. It should be remembered that many of these infected cases had been grossly infected, and could not have undergone re-amputation for weeks or months later had it not been possible to administer post-operative penicillin; yet there were no failures in this series and only 3 cases of delayed healing. In the third series, even with 8 failures not included, it is found that the average healing-time was 21 weeks—more than twice the period in similar cases which had received penicillin after operation.

From these results it can be claimed that the use of penicillin not only shortens the time between operation and limb-fitting, but makes it possible to operate on doubtful cases considerably earlier than would otherwise be feasible. Convalescence is shortened and a far better prospect of success is assured.

Summary

A report is given of 102 amputations and re-amputations. Of these 55 were infected or potentially so at the time of operation; 34 of them received post-operative penicillin and 21 did not. The results show that, in selected cases, it is possible to operate on infected cases much earlier with than without penicillin, and with good prospects of success. In this way convalescence can be considerably shortened, and the patient can start earning his living earlier.

It is pointed out that there were no failures in the penicillin series, and in only 8.8% of this series was there delay in healing of stumps. Emphasis should be laid on the necessity for penicillin-sensitivity tests before operation.

Careful attention should be paid to operative technique, and operation should not be undertaken in the presence of active inflammation or profuse discharge from a granulating wound.

My thanks are due to the Director-General, Medical Services, Ministry of Pensions, and the Medical Superintendent at Chapel Allerton for permission to publish these series; also to my colleagues—especially Mr. A. Lawson Light, who performed some of the operations—for helpful criticism, and to the pathological department and office staff for their assistance.

DESCENT OF THE TESTIS IN RELATION TO TEMPERATURE

BY

ALEC W. BADENOCH, M.D., Ch.M., F.R.C.S.

Wing Commander, R.A.F.V.R.; Surgeon, Metropolitan Hospital, London

The abdominal position of the foetal testis was known to Galen (Frankl, 1895), but Baron Haller (Hunter, 1837) and John Hunter (1837) really first focused attention on this point and began the stream of literature, which has flowed on in such quantity from observers, on all aspects of development and descent. The facts are few and not greatly in dispute; the fancies prolific and constantly recurring.

The Position in Mammals

The descent of the testis is peculiar to mammals. In all animals, up to and including reptiles and birds, the testis lies high up in the abdomen, and in some of the more primitive mammals, such as the Monotremata (duck-billed platypus and spiny ant-eater), this position persists. In the higher groups the testis lies in the false pelvis. Most of the Edentata (sloth, ant-eater, and armadillo), some of the Insectivora (shrew), the Cetacea (whale and porpoise), and the Sirenia (seacows) have primary abdominal testis with no inguinal fold. In marsupials (kangaroo and wallaby) the testis lies in the suprapubic region, in a well-developed pouch with a closed processus vaginalis. According to Andrews and Bissell (1934) this is really inguinal and represents the earliest extra-abdominal position. In rodents, some of the Insectivora (mole and hedgehog), and Cheiroptera (bats) the testis is intra-abdominal in the resting phase of the sexual cycle. During the rutting season it is extruded by unstriated and retracted by striated muscle; there is no true vaginal process. In the Ungulata, Carnivora, and Primates there is a true vaginal process, and the testis is extra-abdominal. The elephant is an exception, the testis being inside the abdomen; and in some—e.g., the stag—the testis is retracted at other than the rutting season. It has been said that the processus vaginalis is occluded only in man and some of the higher monkeys, but occlusion must sometimes occur in other animals, since hydrocele has been reported in dogs and bulls.

Cause of Migration

There is no physiological reason why the testis should not leave its primitive position in the abdomen. Certainly as regards its spermatogenic function it plays no part in the general economy of the body, and, as Crew says, it belongs to the race rather than to the individual. When discussing the problem of its extra-abdominal position Herbert Spencer (1866) wrote: "We cannot consider it an adaptive change, since there seems no way in which the production of sperm cells, internally carried on in a bird, is made external by adjustment to the changed requirements of mammalian life. Nor can we ascribe it to the survival of the fittest, for it is incredible that any mammal was over-advantaged, in the struggle for life, by this changed position of the organ." I think all would be in agreement with the last sentence, but the previous one is now known to be incorrect.

Influence of the Scrotum on Spermatogenesis

In any animal in which the testis normally descends, in order that it may attain full development and function, it must reach and occupy the terminal part of its destined course. Griffiths (1895) showed that if the testis of a dog was replaced in the

abdomen it diminished in size and lost its spermatogenic function. In 1924 Moore performed a series of experiments at the Hull Zoological Department, Chicago, using guinea-pigs, rabbits, and rats. In these animals there is a wide-open connexion between the scrotum and the peritoneal cavity, and the testis can be kept in the peritoneal cavity without in any way interfering with its nerve or blood supply. Moore found that in testes retained in the abdomen for as short a time as seven days there was total disorganization of the germinal epithelium of the seminiferous tubules. The usually well-defined tubular lumen was practically filled with a mass of cells thrown out from the epithelium. Some of the cells could be seen in outline only. Others showed fragmentation of the nucleus, and protoplasmic masses were localized in a granular debris. After 14 days' peritoneal retention most of the debris resulting from degeneration had been removed from the tubules, although a few cells could still be seen. At the end of 21 days little remained of the tubules except the reticulum, with the cells of Sertoli lying against the inner border of the basement membrane. A typical cryptorchid had therefore been produced in three weeks. Subsequent examination of testes showed that there was a progressive diminution in the size of the tubules so that they had shrunk to about one-third of their former diameter. Concomitantly, the interstitial cells had become more prominent and were arranged in masses between the now more widely separated tubules. Certain testes were then replaced in the scrotum, and in a few months the tubules in these had returned to normal. These experiments were confirmed by Wangensteen (1927), who used immature and young dogs for the purpose.

It follows, therefore, that the scrotum exerts a peculiar and striking influence on the testes—an influence that is necessary not only for the differentiation of the germ cells but also for the retention of cells already differentiated.

Influence of Temperature on Spermatogenesis

Meek (1920) noted that the length and periodicity of the spawning of certain fish varied with the temperature of the water. Crew (1921–2) first drew attention to the efficiency of the scrotum as a temperature-regulating organ. It is a pouch of very thin skin well supplied with sebaceous glands. The dartos is firmly attached to the skin, is of non-striated muscle, and quickly responds to changes of temperature. In warmth the scrotum becomes lax, flaccid, and pendulous, while in cold it is corrugated, short, closely invests the testis, and draws it against the body wall. Further, there is no fat in a normal scrotum. When the scrotal skin becomes thickened by a pathological condition, such as elephantiasis, atrophy of the testis occurs. Fukui, in 1923, applied heat to the testis in various forms such as hot air, arc light, and sunlight, and found that exposure to excessive heat was followed by degeneration of the seminiferous tubules. He then elevated both testes of an animal into the peritoneal cavity and artificially cooled the external area in the region of the testes on one side. On examination of the testes after a few days he found that the cooled one was normal while the other showed degeneration of the tubules.

In 1924 Moore and Oslund insulated the scrotum of a ram against heat loss by loosely encasing it in a woollen garment, with a waterproof cover sewed to fit the contour of the scrotum and suspended by artificial supports to prevent abnormal pressure. After 80 days the testes were found to be devoid of spermatozoa; many tubules were in an advanced stage of degeneration, and in others the germinal epithelium had disappeared. As Moore says, "the animal had sterilized itself with its own body heat."

Subsequently Moore and Quick (1924) performed a series of experiments on rats, rabbits, and guinea-pigs and found the scrotal temperature was appreciably lower than that of the peritoneal cavity in each case. They applied hot-water pads to the external surface of a guinea-pig's scrotum, raising the temperature approximately 7 to 8° C. above normal, and on examining the testes in 10 days' time found severe tubular degeneration.

Hill (1937) has made the interesting observation that when the ovaries of mice are grafted on to the ears of castrated male mice the atrophied vesicles and prostate are restored to almost normal. Abdominal transplants have no effect. The inference is that the lower temperature of the ear (similar to that of the scrotum) has stimulated the ovary to produce androgen. Hill suggests that the environment may well condition the production of the specific compounds of the gonad.

Temperature in the Human Scrotum

Harrenstein (1928) performed experiments on 16 children, between the ages of 1 and 11 years, on whom an operation for inguinal hernia or retained testis was being done. He found a considerable difference between the intraperitoneal and scrotal temperatures in each case, the average being 4.9° C. and 3.5° C., depending on whether a short- or long-bulbed thermometer was used.

I have recently carried out temperature recordings in 30 male adults operated on for inguinal hernia. Two long-bulbed laboratory thermometers registering degrees centigrade in tenths were employed. The hernial sac was dissected clear from the cord and opened. A finger was passed downwards into the scrotum, along the cord, until the tip was in approximation with the body of the testis. Both thermometers were introduced through the opening in the sac into the peritoneal cavity, until each bulb was lying on the floor of the iliac fossa. In two to three minutes the temperature on each thermometer appeared stabilized, and a reading was taken. One thermometer was now withdrawn and passed into the scrotum. Readings were recorded at one-, two-, and three-minute intervals. The thermometer was then removed and again introduced into the peritoneal cavity, a further reading being taken at the end of

TABLE I.—*The Intrascrotal and Peritoneal Temperature Recordings in 25 Adults*

Age	Initial Peritoneal Temperature	Scrotal Temperature			Final Peritoneal Temperature		Theatre Temperature	Maximum Variation	Anaesthetic
		1 Minute	2 Minutes	3 Minutes	P. Ther.	S. Ther.			
21	37·5°	35·0°	34·5°	34·1°	37·8°	37·6°	74°	3·7°	L
27	37·0°	35·8°	35·5°	35·5°	37·3°	37·3°	78°	1·8°	L
22	37·0°	35·5°	35·2°	35·0°	37·0°	37·0°	78°	2·0°	L
24	37·5°	36·0°	35·5°	35·5°	37·5°	37·5°	78°	2·0°	G
38	37·5°	36·0°	35·3°	35·3°	37·5°	37·5°	78°	2·2°	L
20	36·5°	34·8°	34·9°	34·9°	36·8°	36·8°	72°	2·0°	L
18	37·0°	34·0°	33·8°	33·8°	37·0°	37·0°	72°	3·2°	L
19	37·0°	35·4°	35·6°	35·6°	37·0°	37·0°	72°	1·6°	L
26	38·1°	35·8°	35·6°	35·5°	38·2°	38·1°	76°	2·7°	L
40	36·5°	35·2°	34·8°	34·9°	36·9°	36·9°	70°	2·1°	L
26	36·8°	34·4°	34·2°	34·2°	36·8°	36·8°	70°	2·6°	L
33	36·0°	34·5°	34·5°	34·6°	36·4°	36·3°	72°	1·9°	L
19	37·0°	35·2°	35·2°	35·3°	37·2°	37·1°	72°	2·0°	L
37	36·5°	33·3°	33·2°	33·4°	36·2°	36·1°	72°	3·3°	L
31	36·4°	34·1°	34·1°	34·2°	36·7°	36·6°	72°	2·6°	L
19	37·0°	35·0°	35·1°	35·1°	37·2°	37·3°	75°	2·1°	L
40	36·7°	34·7°	34·7°	34·7°	36·8°	36·8°	74°	2·1°	S
31	36·8°	35·0°	35·1°	35·1°	36·8°	36·8°	74°	1·7°	L + P
40	36·5°	35·2°	35·2°	35·2°	36·6°	36·7°	74°	1·4°	L
42	36·6°	35·6°	35·7°	36·0°	36·6°	36·7°	72°	1·0°	S
39	37·2°	34·4°	34·5°	34·5°	37·2°	37·2°	70°	2·8°	L + P
18	36·9°	34·3°	34·3°	34·4°	37·1°	37·0°	74°	2·8°	S
19	36·8°	34·6°	34·7°	34·7°	37·0°	36·9°	72°	2·4°	L + P
30	37·0°	36·3°	36·4°	36·2°	37·0°	37·1°	78°	0·8°	L + G
27	35·2°	33·5°	33·0°	32·9°	35·4°	35·5°	72°	2·5°	S

Peritoneal and scrotal recordings are in centigrade, theatre recordings are in Fahrenheit. L = Local; G = General; P = Pentothal; S = Spinal.

TABLE II.—*The Intrascrotal, Pubo-inguinal, and Intraperitoneal Temperature Readings in 5 Adults*

Age	Initial Peritoneal Temperature	Scrotal Temperature	Pubo-inguinal T.		Final Peritoneal T.		Pubo-inguinal Variation	Scrotal Variation	Theatre Temperature	Anaesthetic
			1 Minute	2 Minutes	P. Ther.	S. Ther.				
40	36·7°	34·6°	35·6°	36·0°	37·2°	37·0°	1·6°	2·1°	74°	S
33	37·3°	35·5°	36·5°	36·5°	37·5°	37·5°	1·0°	2·0°	78°	L+G
19	37·1°	34·6°	35·8°	35·8°	37·1°	37·2°	1·3°	2·6°	70°	L+P
27	37·1°	34·5°	37·7°	35·7°	37·2°	37·1°	1·5°	2·6°	74°	L+P
35	37·3°	34·8°	35·6°	35·6°	37·4°	37·4°	1·8°	2·5°	74°	L

Peritoneal and scrotal recordings are in centigrade, theatre recordings are in Fahrenheit. L = Local; G = General; P = Pentothal; S = Spinal.

a minute. The majority of cases were operated on under block local analgesia, occasionally supplemented with 0.5 g. of pentothal intravenously. In no case was any deleterious effect produced. Table I shows the results in 25 cases with a three-minute record of scrotal temperature. Table II shows the results in 5 cases when the thermometer was withdrawn from the scrotum after one-minute and two-minute interval recordings of the temperature in the pubo-inguinal region were taken.

From these two tables the following facts are deduced. In each case the temperature is lower in the scrotum than in the iliac fossa. This varies from 0.8° C. to 3.7° C., with an average difference in 30 cases of 2.2° C. The temperature in the pubo-inguinal region in each of 5 cases is higher than that in the scrotum but an average of 1.4° C. lower than that in the iliac fossa.

Discussion

Is this thermal influence a cause or an adaptation of migration? Many observers (Hart, 1908–9; Crew, 1921–2; Keith, 1933) have taken the view that the cause of migration is mechanical. With changing methods of progression, the dense, compact, suspended testis was gradually compelled to pass from the primitive position towards the inguinal region of the abdominal cavity. It then came to lie in the lymph spaces described by Sabin. With increasing impulsiveness of movement and with the increase in abdominal pressure following the development of the diaphragm, the testis was forced along the lymph tracts until it came to lie in the subintegumental position in the groin. Further impulsive activity produced a hernia of the testis into the scrotum. I do not consider this theory at all satisfactory. It is only in the male of the species that the reproductive gland normally "herniates"; and why should this comparatively small organ be the only one to do so on mechanical grounds? The large group of rodents and the stag, which undoubtedly are as active and impulsive in their movements as any other mammal, have intra-abdominal testes except in the rutting season. I believe that the migration is a search for a lower temperature. In the Monotremata and certain lower orders with abdominal testes, body temperature is much more variable than in the higher mammals. In the whale the amount of subcutaneous blubber would insulate the testis, and the thick skin of the elephant would preclude heat loss. Andrews and Bissell have put forward the view that these two groups are secondary testiconda. We know that eels migrate to breed in the depths of the Saragossa Sea, that salmon and other fish migrate to the upper reaches of mountain streams for their breeding, and that birds migrate to a colder area during their nesting season. It is not unreasonable, therefore, to suggest that in mammals the reproductive gland, instead of the whole animal, migrates for the same specific purpose.

Summary

The position of the testis in the various groups of mammals is discussed.

The influence of temperature on spermatogenesis is reviewed.

Recordings of the temperature in 30 young adults are given.

It is suggested that the extra-abdominal position of the testes is a migration in search of a temperature lower than that of the body.

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H. H. Rosenblum (*U.S. Nav. med. Bull.*, 1945, **44**, 375) states that Reiter's disease, which has been recognized only in young men, is characterized principally by acute purulent urethritis, acute conjunctivitis, and acute arthritis, often occurring in that order. The most helpful analgesic was acetylsalicylic acid and codeine in moderate doses.

"FASTNESS" OF STAPHYLOCOCCI, HAEMOLYTIC STREPTOCOCCI, AND PNEUMOCOCCI TO PENICILLIN

BY

E. W. TODD, M.D., D.P.H.

G. S. TURNER, A.I.M.L.T.

AND

L. G. W. DREW

*(From the Serum Institute, Wellcome Foundation, Carshalton, Surrey)**

In a previous communication Todd, Turner, and Drew (1945) showed that two different strains of staphylococcus became highly resistant to penicillin when subcultured daily in penicillin broth. The resistance of the strain "Oxford H" was increased 3,000 times after 27 subcultures, and the resistance of strain "Staphylococcus A" was increased 250 times after 21 subcultures. This high degree of resistance to penicillin disappeared rapidly when the organisms were subcultured daily in plain broth.

The same methods of investigating (1) the time required to produce "fastness" to penicillin and (2) the temporary or permanent character of this acquired change have now been applied to haemolytic streptococci and pneumococci.

Staphylococcus

The cultivation of strains of "Oxford H" and "Staphylococcus A" in penicillin broth, described in a previous paper, was continued. After 75 subcultures in penicillin broth both the strains were 5,000 times more resistant to penicillin than the original cultures; they both grew in broth containing 400 units of penicillin per c.cm. On subcultivation in plain broth the resistance of both strains to penicillin was rapidly lost.

Haemolytic Streptococcus

Rake *et al.* (1944) subcultured *Str. pyogenes* (Strain C 203, Group A, Type 3) in penicillin broth. After 58 subcultures the dose of penicillin required for "bacteriostasis" had increased from 0.03 to 0.95 unit per c.cm., showing a 30-fold increase in resistance. They do not state whether this resistance was maintained or lost on subcultivation in plain broth.

Fig. 1 shows the results of subculturing Strain C 203 daily in broth containing falling dilutions of penicillin on a 20% range in a total volume of 1 c.cm. The daily variations in

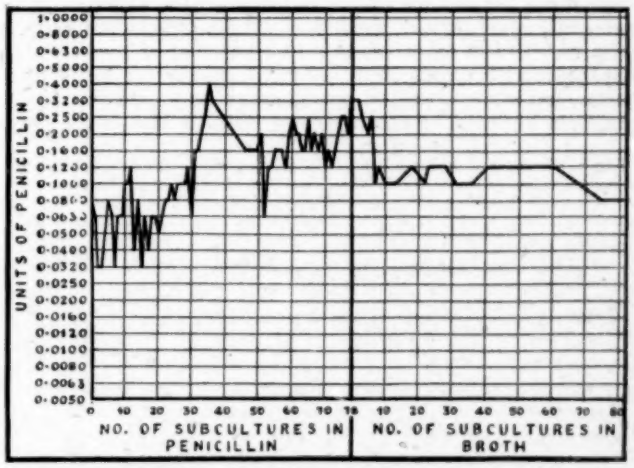

FIG. 1.—Showing increasing resistance on subculture in penicillin, followed by diminishing resistance on subculture in broth. *Str. pyogenes*, Strain C 203, Group A, Type 3.

resistance were much greater than those obtained with staphylococci (Todd, Turner, and Drew, 1945). This was particularly noticeable at the beginning of the experiment, before any definite increase in resistance was observed. Resistance to penicillin was increased five times after 35 subcultures and four

* Seconded from the London County Council.

times after 78 subcultures. On subcultivation in plain broth "fastness" was maintained for two days; it then began to fall until after 76 subcultures the original "bacteriostatic" dose of 0.08 unit of penicillin per c.cm. was again effective. There is, however, considerable doubt whether 0.08 unit per c.cm. was the true "bacteriostatic" dose for the original culture, since smaller effective doses were observed on a number of occasions at the beginning of the experiment. A direct comparison of the original culture, which had been kept in a dry state, with the 82nd subculture of the resistant strain in plain broth gave the following results:—"Bacteriostatic" dose: original culture 0.02 unit per c.cm.; 82nd subculture, 0.08 unit. Nevertheless the general appearance of Fig. 1 suggests that "fastness" of haemolytic streptococci to penicillin is a temporary acquired character which is gradually lost on subcultivation in broth.

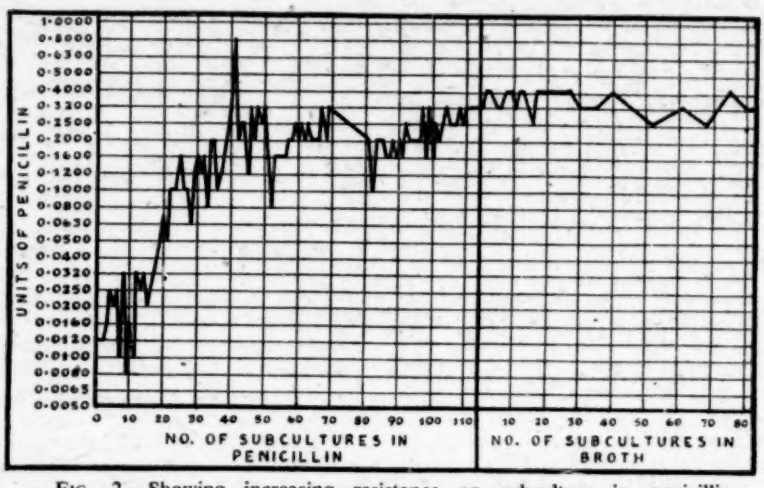

FIG. 2.—Showing increasing resistance on subculture in penicillin, followed by maintained resistance on subculture in broth. Pneumococcus, Type III.

Pneumococci

Rake *et al.* (1944) subcultured Pneumococcus Type III in penicillin broth 55 times, thereby increasing the resistance of the strain to penicillin 30 times. After 32 subcultures of their resistant strain in ordinary blood broth the "bacteriostatic" dose of penicillin remained unchanged.

Fig. 2 shows the results of subculturing Pneumococcus Type III first in penicillin broth and then in plain broth. Resistance to penicillin was increased 27 times after 46 subcultures, and this level was maintained after 114 subcultures in penicillin broth. "Fastness" to penicillin was maintained after 82 subcultures in plain broth. This confirms the observation of Rake *et al.* (1944) that acquired "fastness" of pneumococci to penicillin is a permanent character.

Discussion

Although the number of strains used in these experiments is too small to draw any general conclusions there are certain facts which seem to be established. The first of these is that staphylococci become penicillin-"fast" much more easily than haemolytic streptococci or pneumococci on subcultivation in penicillin broth. The accompanying Table, which is compiled from the figures of Rake *et al.* (1944) and of Todd, Turner, and Drew, shows a 4,000-fold average increase of resistance to penicillin for five strains of staphylococci, compared with an 18-fold average increase for four strains of pneumococci and a 16-fold average increase for a single strain of *Str. pyogenes*, although the average number of subcultures in penicillin was greater for the pneumococci and streptococci than for the staphylococci.

Table showing the Number of Subcultures in Penicillin Broth required to produce Penicillin-"fast" Cultures, and the Degree of "Fastness" obtained with Various Organisms

Authors	Organism	Strain	Number of Subcultures in Penicillin Broth	Increase of Resistance to Penicillin
Rake *et al.* ..	Staphylococcus	"Smith"	59	6,000 times
" " ..	"	C 1	28	1,000 "
" " ..	"	C 2	28	4,000 "
Todd *et al.* ...	"	Oxford H	72	5,000 "
" " ..	"	A	77	5,000 "
Rake *et al.* ..	Pneumococcus	Type I	54	6 times
" " ..	"	" II	62	6 "
" " ..	"	" III	55	32 "
Todd *et al.* ...	"	" III	114	27 "
Rake *et al.* ..	Str. pyogenes	C 203	58	27 times
Todd *et al.* ..	"	C 203	78	4 "

Secondly, the observation of Rake *et al.* (1944) that penicillin-"fast" pneumococci maintain their "fastness" on subcultivation in ordinary laboratory media, without penicillin, is confirmed. On the other hand a single strain of *Str. pyogenes* lost its "fastness" on subcultivation in plain broth, behaving in this respect more like staphylococcus than pneumococcus.

Summary

Staphylococci are easily made penicillin-"fast" by subcultivation in penicillin broth; they lose their acquired "fastness" when subcultured in plain broth.

Haemolytic streptococci, so far as can be judged from the behaviour of a single strain, are more difficult to make penicillin-"fast" than staphylococci; they also appear to lose "fastness" when subcultured in plain broth in a similar way to staphylococci.

Pneumococci also acquire "fastness" much less readily than staphylococci; they maintain acquired "fastness" when subcultured in ordinary laboratory media.

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Medical Memoranda

Hypersensitivity to Quinine and Mepacrine

In view of the great importance and widespread use of chemotherapy in the suppression of malaria at the present time, the following rarity is of topical interest.

CASE REPORT

The patient was an air-crew officer, aged 25, who took one tablet (0.1 g.) of mepacrine hydrochloride at 1 p.m. on Nov. 19, 1944. Two hours later he began to notice a certain itchiness and painfulness of the skin of his hands and feet, and shortly afterwards these and the scrotum, penis, and nipples began to swell. At the same time the skin of his whole body became red and his throat felt as if it was swollen. About one hour after the onset of his symptoms he began to feel hot; he had a slight frontal headache and marked anorexia and nausea, but no actual vomiting. There were no other symptoms. This was the first mepacrine tablet he had ever taken.

On examination his temperature was 104° F. and pulse 96. The skin of the whole body showed a marked generalized erythema, with no blanching on stroking it. The lips were slightly cyanosed. Some conjunctival injection was present. There was considerable oedema of hands, feet, scrotum, penis, nipples, and eyelids, with slight swelling of the fauces. Otherwise nothing abnormal was found.

Treatment with adrenaline, ephedrine, and magnesium sulphate was given, but without any effect. His temperature, however, settled in 18 hours, and all the oedema and erythema had disappeared in 48 hours. The next week the skin of his body generally, and of his scrotum in particular, peeled, and during this time it remained itchy.

His previous history showed that about three weeks before this reaction he had taken one quinine hydrochloride tablet (6 gr.), and this had produced very similar effects to the reaction described above, with the following two differences: (i) the onset of the quinine reaction occurred four hours after he had taken the tablet; (ii) he had had no rise in temperature after taking the quinine.

When the erythema and oedema of the mepacrine reaction had disappeared I scratch-tested him with both quinine and mepacrine

suspensions in normal saline, using a normal saline control; marked localized urticarial reactions occurred with both the quinine and the mepacrine, while the control showed no reaction. As a result of these tests he was considered unfit for service in malarious areas.

Such a condition must be very rare indeed, and I can find no reference to this double hypersensitivity in any textbook available to me at present. In fact, in *Memorandum on Medical Diseases in Tropical and Subtropical Areas* there occurs this statement: "Those with an idiosyncrasy to quinine can take mepacrine with impunity. Mepacrine appears to provoke no similar condition."

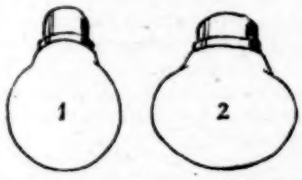
John Orr, M.B., Ch.B.,
Fl. Lieut., R.A.F.V.R.

A Source of Error in the Determination of Cell Counts

The flatness of the cover-slips used for counting-chambers is usually taken for granted. It is perhaps not as widely known as it might be that slips which are not flat are occasionally met with. As all such slips are ground flat, one can only assume that they warp after manufacture as the result of internal stresses. Inaccurate cell counts result.

A degree of deformity too small to be perceptible by inspecting the cover-slip edge-on may cause gross inaccuracy. Thus a slip which is only 10μ "off the flat" at the highest point of the convexity will cause an inaccuracy of 10% if the correct depth of the counting chamber is 0.1 mm. A curved cover-slip, used sometimes with the convexity upwards, sometimes downwards, will cause puzzling fluctuations in the cell count of the same patient.

Once a cover-slip has been found to be defective it may be thought advisable to determine the degree of inaccuracy with a view to adjusting counts that have previously been made with it. This is possible only when one can be sure that the curve has been upwards or downwards in all estimations, when the amount by which the curve is off the flat, expressed as a percentage of the correct chamber depth, can be deducted from



Distortion of the image of a spherical bulb caused by a deformity of 10μ off the flat.

or added to the counts, as the case may be. If, as has probably been the case, the convexity was sometimes upwards and sometimes downwards, measurement of the degree of deformity will at least show whether it is so great as to place previous counts beyond the permissible limits of inaccuracy.

Recognition of Deformity

Any such deformity may be easily and quickly perceived and measured by the following method:

1. Hold a corner of the cover-slip lightly between the tips of thumb and forefinger.
2. Stand with the back towards a lighted lamp, and about 1 metre from it.
3. Hold the slip at arm's length, and at such an angle that the reflection of the light bulb can be seen in it. If the slip is deformed the image will be distorted. Such deformation is usually cylindrical, resulting in an image which is elongated or compressed in one axis so that a circular light-bulb appears oval.
4. Hold the slip with the concavity facing the eye as shown by an elongation of the long axis of the oval reflection.
5. Note by what proportion approximately the long diameter exceeds the short. Then, assuming that the distance between eye and slip is 30 in., it may be shown, by reasoning beyond the scope of this paper, that if the excess is 28% the slip is 10μ off the flat (see Fig. 2), if 12½% it is 5μ, and if 6% it is 2½μ. In practice an approximate estimate of this excess is sufficient.

The whole process is a matter of a few moments, and large numbers of slips can be examined in a short time.

The presence and extent of such deformity can, of course, be determined with the aid of a microscope with a calibrated fine adjustment. A few small drops of a solution of a coloured substance—e.g., ink—are allowed to dry on the surface of the slip, which is then placed, coloured surface downwards, in position on the counting-chamber. The dried ink is first focused, then the ruled squares, the fine adjustment being read on each occasion and the true depth of the chamber noted. The correct depth subtracted from this will give the figure required.

The first method described has the advantage of simplicity and speed, and does not entail the use of a microscope with a calibrated fine adjustment.

St. Giles' Hospital (L.C.C.), Camberwell. Bernard Freedman, M.B., M.R.C.P.

Salivary-gland Tumour of the Upper Lip

The following record of a case of some rarity may be found of interest.

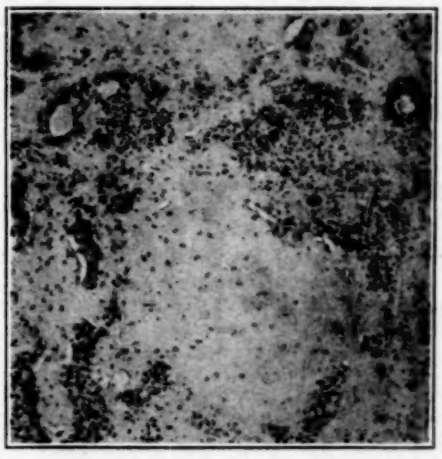
Case Report

A girl aged 18 came under my care in the Royal Infirmary, Edinburgh, in March, 1940, on account of a painless swelling of the upper lip which had been present for many years but had become larger and rather disfiguring recently. It was centred strictly in the midline and protruded on the buccal surface, covered by normal mucous membrane. Using a local analgesic, a transverse incision was made through the mucous membrane, and a solid round tumour, one inch in diameter, was enucleated very easily and completely. The wound was sutured and healed without difficulty, a perfect cosmetic result being obtained.

Histological examination demonstrated the characteristic appearance of a mixed tumour of the parotid (see Fig.). There were hyperchromatic epithelial cells, arranged in the form of alveoli and in solid masses, and a stroma showing the appearance of the so-called cartilage. There was no evidence of malignancy.

Comment

The mixed tumour of the salivary glands occurs most frequently in the parotid and less so in the submandibular and sublingual glands, but it also arises in uncommon sites such as palate, tongue, pharynx, larynx, neck, face, orbit, scalp, auditory canal, lacrimal gland, and lips. Sir James Paget in 1851, according to Cade (1937), was the first to describe a



A photomicrograph of the specimen.

parotid tumour in the lip, and of the cases noted since then in the upper and lower lips four were recorded by Wood (1904), one by Schreiner and Mattick (1929), one by Patey (1930), two by Ahlbom (quoted by Cade), and four by Robbins (1943). An aberration in the development of the salivary-gland tissue may possibly account for some of the unusual positions. Ahlbom (1935), however, believed that the tumours in all sites should be classified as mucous-gland and salivary-gland tumours, in which case a tumour of the lip can be explained as arising from a mucous gland and not from an aberrant portion of parotid tissue. In his opinion, also, such tumours are quite benign at the age of the patient here reported.

I wish to thank Dr. R. F. Ogilvie for the histological examination and Mr. D. Smith for the photomicrograph. I am indebted to Mr. John Harkness, who saw the patient with me and actually suggested the correct diagnosis.

Edinburgh. J. F. Curr, F.R.C.S.Ed.

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The *Annals of Science*, the quarterly review of the history of science since the Renaissance, which has been in abeyance since December, 1942, has resumed publication with the issue of July 15.

Reviews

A HISTORY OF MEDICINE

A History of Medicine. By Douglas Guthrie, M.D., F.R.C.S.Ed. (Pp. 448; illustrated. 30s.) London: Thomas Nelson and Sons.

Throughout the ages the Genius of Medicine has frequently changed her home. Born in Sumeria out of priestcraft and superstition, her migration to Egypt did little to redeem that origin. It required the clear intellectual atmosphere of Greece to instil some measure of reason and a capacity for observation. The subsequent extensions to Alexandria and to Rome were entirely Greek in inspiration. As Rome declined, the persecuted Nestorian Christians carried that heritage first to Edessa and then to the court of Haroun-al-Raschid. Hence arose Arabic medicine, which carried on the tradition for several centuries. Only at Salerno was the older Hippocratic method followed, and as this was carried out by progressive teachers its star shone brightly in a dark age from 1096 to 1270, to be eclipsed by the rise of Montpellier, which adopted the Arabic tradition. This tradition had spread far beyond the Arabs themselves; thus the celebrated Maimonides of Cordova was a Jew. After the rise of Montpellier came that of Padua, an offshoot from Bologna. All these migrations are well described in Dr. Douglas Guthrie's *History of Medicine.* Coming to the Renaissance he truly says "it was a change in the entire outlook of thinking men who sought to escape from the tyranny of dogmatic scholasticism. . . . There arose a demand for freedom of thought, a new standard of human dignity and a philosophy of living." Appropriately said in view of the recent attempts to detract from its accomplishments. The centre of the new learning was Florence, which except for Athens has done more to free the human mind from its self-imposed shackles than any other city. But in medicine at the hands of such men as Linacre all that was attempted was at first a simple revival of Greek learning; no new observations were thought necessary. Revival of interest in the study of anatomy was initiated by the artists, particularly Leonardo, and not by the physicians.

The year 1543 marks the birth of modern science; Copernicus revolutionized our conceptions of the universe, and Vesalius published his great anatomical textbook *De Fabrica.* The pace of advance quickened. William Gilbert initiated experimental physics, and Harvey applied them to physiology. England also rejoiced in great clinicians such as Glisson, Willis, and Sydenham. The founders of the Royal Society gave a scientific cast to medicine. The early 18th century saw the rise of Leyden under Boerhaave, and English physicians resorted there rather than to Padua. A little later came the rise of the Edinburgh School, marred unfortunately by bitter quarrels. The beginning of the 19th century witnessed the undoubted leadership of the French school, particularly in Paris. A few years more and the clinicians of London and Dublin bore the palm, while the later half of the century was marked by the dominance of the Viennese and German schools. This ascendancy was waning even before Germany elected to shut herself out from the comity of science. It looks as if the future leadership may rest with the United States, with its wealth and capacity for organization. The Mayo Clinic is an exemplar of the new medicine. Fortunately the leading American physicians are becoming alive to the danger of the individual patient being subordinated to the mighty machine they have created. It is interesting to speculate on the causes of these repeated migrations. Political changes can have a disruptive effect, but on the constructive side can do little more than provide a stable enviroment. Sometimes it is a single man, like Boerhaave, whose individual genius had a magnetic attraction, or a group of men like the quartette of Osler, Welch, Halsted, and Howard Kelly, who created Johns Hopkins Hospital's pre-eminence. Always the man; one thinks of the unfavourable conditions under which Michael Foster created a great school of physiology at Cambridge. The decline of a school, on the other hand, is often due to complacent "ancestor worship."

Though the theme of migrations runs through Dr. Guthrie's book, he casts his net widely to include all aspects of medicine. To do this in reasonable compass without reducing it to a catalogue is no light task, but he has achieved it by skill and discrimination. His style is attractive and pleasant to read, and the pages are lightened by admirable pen-portraits of outstanding personalities. His erudition is free from pedantry. Rapid technical advances in medicine are tending to diminish interest in its cultural aspects. Dr. Guthrie strongly holds that a study of medical history would tend to correct this and give a due sense of proportion. Formal lectures are hardly possible in the overcrowded curriculum. The simplest plan is that adopted by Sir Norman Moore, who interpolated interesting historical data relevant to the case under consideration.

The volume is admirably produced in this age of so much slovenly work. It is enriched with 72 plates collected from many sources, and a map of the migrations. There is a classified bibliography of the more important references, and (needless to add) a full index. We hope the book will have the success it deserves.

W. L.-B.

RHEUMATIC DISEASES

The Rheumatic Diseases. By G. D. Kersley, M.D., F.R.C.P. With foreword by Sir Francis R. Fraser, M.D., F.R.C.P. Second edition. (Pp. 120; illustrated. 15s.) London: William Heinemann (Medical Books) Ltd. 1945.

The appearance of a second edition of this little book is an indication that it has been found a useful guide to the manifold aspects of rheumatism. It is unfortunate, however, that the new edition should be marred by so many misprints, mostly trivial, but some more serious, such as the recommendation to give 1–2 *gm.* of thyroid extract twice a day when grains are evidently intended; even in the bibliography there is evidence of failure to verify the references.

The clinical features of typical examples of the various types of rheumatic disease are clearly described, and the pathology is discussed with special reference to them, so that the reader may visualize the influence of the disease on the tissues of the patient and the principles of treatment. A well-balanced comparison is drawn between primary and secondary or focal forms of rheumatoid arthritis, and the author favours the view that sensitization is probably an important factor. Many authorities are quoted on different subjects, often giving conflicting opinions which may be found confusing by the ordinary reader, and a clear and perhaps dogmatic exposition of the author's own practice and experience would be of greater service.

The description of physical methods of treatment and their rationale is good and will prove most helpful to the general practitioner; they will be found of greater value in many rheumatic disorders than the usual medicines or "rubbing bottles" so often expected by the patient. It would have been an advantage if such physical methods as can be adapted for home use had been described in more detail with this end in view. The account of the various massage techniques will be found useful to the doctor, who, if he is to ensure the best results, should be able to describe the object to be attained and the best methods of securing it. The account of the methods in use at the spas is clear, convincing, and free from exaggeration. The book is lavishly illustrated, though some of the reproductions of skiagrams are poor.

THE EOSINOPHIL CELL

L'Éosinophilie Générale et Locale. By L. Dérobert. Preface by Prof. M. Duvoir. (Pp. 238. No price given.) Paris: Librairie J.-B. Baillière et Fils. 1942.

This monograph is written in the sound tradition of the classical French thesis, which summarizes the literature of a restricted and often recondite branch of medicine. It is addressed to the experimental haematologist and pathologist rather than the general reader, and it provides a useful quarry of references and ideas. Dérobert's own researches have been chiefly concerned with a study of the tissue eosinophils in hyperpyrexia, and after the inhalation of pepper and the active principles of pepper. He believes that eosinophil cells may originate both in the bone-marrow and in the tissues, and he supports the generally accepted view that the function of the eosinophil cell is to deal with foreign or altered proteins in the body. The subject is highly technical and the book is not easy reading. It leaves one with the impression that, though a great deal of work has been done, we still have little precise

knowledge about the life story of the eosinophil or the nature of its prominent granules. The standard methods of examining the blood and the tissues do not seem adequate for the solution of these problems, and we must wait on more novel or refined techniques for further advances.

MOSQUITOES OF THE AUSTRALASIAN REGION

Keys to the Mosquitoes of the Australasian Region: Including a Synopsis of their Distribution and Breeding Habits. By Kenneth L. Knight, U.S.N.R., Richard M. Bohart, U.S.N.R., and George E. Bohart, U.S.N.R. National Research Council: Division of Medical Sciences. (Pp. 71. No price given.) Issued by the Office of Medical Information, Washington. July, 1944.

The systematic entomologist is often accused of counting hairs, but it is safe to say that without his labours little progress could have been made in the study of disease transmitted by insects. This applies especially to the mosquitoes, where the habits of the different species play such a large part in the transmission of disease, and whose importance as vectors of malaria, yellow fever, filariasis, dengue, and possibly other tropical diseases makes their identification one of the first essentials to any research connected with the control of these diseases. Lieuts. K. L. Knight, R. M. Bohart, and G. E. Bohart, of the U.S. Naval Medical Research Unit, are therefore to be congratulated on their most useful revision of the Australasian Culicidae, the result of eighteen months' work in the regions concerned. The Culicidae of many parts of the world, and especially the anopheles mosquitoes, have now been exhaustively studied, and their identification made possible to all and sundry by the publication of authoritative synoptic tables. Even the difficult South American forms have at last been reduced to something like complete order. There still remained, however, a much-needed authoritative synopsis of the no less difficult Australasian species, now clearly and with precision set forth in the reference work published in Washington.

The area dealt with is the Australasian faunal area proposed by Wallace and modified by Swellengrebel and Rodenwaldt (1932), and includes, besides Australia, the Moluccas, New Guinea, and a large part of the Pacific, extending to the Hawaiian Islands, the Marianas to the north, and the Taumoto Archipelago (Society Islands) to the east. New Zealand, South and Western Australia, which possess a large endemic fauna of their own and were far removed from the zone of military activity, are not included in the revision. The whole of the Culicidae are dealt with, in all some 250 species and subspecies (8 *Bironella*, 41 *Anopheles*, 5 *Megarhinini*, 13 *Uranotaenia*, 3 *Hodgesia*, 28 *Tripteroides* (*Rachionotomyia*), 14 *Mansonia*, 100 *Aëdes*, 2 *Aëdeomyia*, 2 *Ficalbia*, and 42 *Culex*). Zoologically the most interesting feature of the fauna dealt with is the absence of certain genera familiar to students of the Oriental species—e.g., *Leicesteria*. But, as the authors note, of the nine genera given by Edwards (1924) as not represented, three have since been recorded. To the malariologist a feature of interest is the now quite large list of species of *Bironella*, that peculiar group of primitive anopheles uniquely confined to New Guinea. Following the various synoptic tables of the different genera is a list giving the distribution and recorded larval habitat of each of the species dealt with. The publication should be of the greatest value, and most helpful to all who may have to do with the identification or control of mosquitoes in this important zone.

Notes on Books

A little book *The Attendant's Guide*, by EDITH M. STERN (Oxford University Press; 3s. 6d.), might well be issued by mental hospitals to their junior nurses. It gives pleasantly worded advice about the handling of the patients, and about most of the problems that are likely to come the way of the mental nurse. Most handbooks of nursing tend to be uninspired and dryasdust on the subject of the attitude of the nurse to her patients, in contrast to which this booklet shows a refreshing humanity informed by knowledge and sense.

The Child Welfare Department of University College Hospital, London, has issued a useful pamphlet on *The Management of Older Babies* (post free 4d.). It covers the period of mixed feeding, from 5 months to 2 years, and deals not only with feeding but with such matters as training in good habits, play, teething, and prevention of illness. A useful section on the need of affection strikes just the right note.

Preparations and Appliances

AN IMPROVED ARTIFICIAL PNEUMOTHORAX NEEDLE

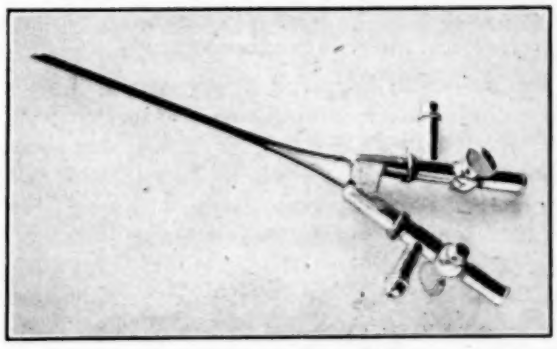
Dr. ALASTAIR ALLAN writes from Greenock:

Recent correspondence in the *Journal* has drawn attention to the occurrence of air embolism, the most dangerous occurrence that may happen during the administration of artificial pneumothorax refills. Air embolism develops with dramatic suddenness and without any useful warning signs; if the occurrence is not immediately fatal, total recovery usually takes place in a few days, but the whole picture is most alarming for all concerned.

With the usual type of pneumothorax needle, after the manometer is observed and read, it is by-passed until the refill has been given, then switched over into the circuit again, and the reading taken. During the refill—the dangerous period—no reading can be observed, and one hopes the point of the needle is still within the intrapleural space: usually it is, but when it is not accidents may happen without warning.

Cameron[1] urges "intelligent use of the manometer" to reduce risks, and Burrell[2] also emphasizes the importance of the preliminary manometer reading. The manometer supplies visible evidence of the presence of the needle-point within the intrapleural space, and it is illogical to be deprived of this visual sign when it is most required—during the actual refill.

Artificial pneumothorax as a specific therapeutic procedure was first carried out by Forlanini in 1888[3] by a method similar



in principle to present-day methods but without a manometer. This handicap was removed by Saugmann in 1904, who was the first to use a manometer to record the intrapleural pressure. Artificial pneumothorax apparatus has remained unchanged in principle since then, and the only changes have been various minor modifications. It may therefore be of interest to describe a needle I have been using, the main purpose of which is to reduce the risk of air embolism. It is simply a double needle with two complete and separate air channels; one is led to the manometer by rubber tubing, the other to the air-flow bottle of the A.P. apparatus. The illustration is approximately half-size linear.

When in use a constant manometer reading of the intrapleural pressure is obtained, before, during, and after the refill; and (it should be unnecessary to add) if no reading can be obtained, then no refill should be administered at that site. One has to experience the feeling of confidence which results to appreciate its value.

The only criticism which might be levelled at this needle is the increase in size of the puncture it produces. Theoretically this is true, but in actual practice it is negligible. "Humanity and common sense call for anaesthetization of the needle track,"[1] and this has always been my practice, and the increased size of the needle can genuinely be discounted. It may be noticed from the illustration that the shape of the point causes the end of one channel to be about 1 mm. longer than the other, and the longer is the one I always connect to the manometer: a "V" point instead of a bevel would bring both channels to exactly the same level. This is probably of theoretical importance only.

The needle was made for me by Vicarey, Davidson and Co., 162, Bath Street, Glasgow, C.2. My thanks are due to Dr. Alexander Johnstone, Medical Officer of Health, Greenock, for permission to publish this.

[1] *Edinb. med. J.*, February, 1941, p. 94.
[2] *Recent Advances in Pulmonary Tuberculosis*, by Burrell, 1937.
[3] *Pulmonary Tuberculosis, Medical and Surgical Treatment*, by H. Morriston Davies, p. 209.

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THE DISCOVERY OF X RAYS

This year is the centenary of Röntgen's birth, and this next week the fiftieth anniversary of the birth of radiology. The *x* rays were discovered in the late evening of Nov. 8, 1895, by Wilhelm Conrad Röntgen, professor of physics in the University of Würzburg. Röntgen handed in his famous "Preliminary Communication" to the Physical-Medical Society of Würzburg on Dec. 28, and it was published at once. On Jan. 6, 1896, the news was cabled from London to the world, and within a matter of days the practical application of Röntgen's discovery to medicine had been confirmed. The science of radiology was born, and if it did not, like Athene, spring fully armed from the brain of its begetter, it at least lost no time in providing for itself a worthy and rapidly improving armamentarium.

As it is often said that the discovery of the *x* rays was an accident, it is only fair to Röntgen's memory that we should regard for a moment the accomplishments of his predecessors and his contemporaries. In this brief recital of the fundamental discoveries British science shines with a very brilliant light. Hauksbee not only made improvements in the air-pump, but was also the first to produce an electrical discharge in a vacuum (1709). William Morgan, a doctor and one of the greatest of actuaries, did a highly original experiment by which he demonstrated that the quality of the rays produced in a partial vacuum depends on the hardness of the tube (1785). Goldstein (1876) introduced the term "cathode stream" for the rays which are emitted from the cathode when an electric discharge is passed through a partial vacuum, and Sir William Crookes really laid the foundation of atomic physics by his demonstration that these rays could be deflected by a magnet, and that they therefore consisted of electrified particles of matter. Crookes must have produced *x* rays very frequently without realizing their nature, and he actually noticed—and complained of—the fogging of photographic plates in the neighbourhood of a Crookes tube in action. Sir Herbert Jackson invented in 1894 a focus tube for use in his experiments on phosphorescence, and *x*-ray photographs were taken with this original tube after the announcement of Röntgen's discovery. The early researches of Sir J. J. Thomson were carried out with Crookes and Lenard tubes. It was Röntgen's discovery which first focused the chief attention of physicists on the effect of various types of rays on gases, and Thomson himself said in 1896 that the discovery appealed "to the strongest of all human attributes—namely, curiosity."

Röntgen was a Rhinelander who was born in 1845, so that this year marks the centenary of his birth. In 1888, when he was called to the chair of physics at Würzburg, he had already held three professorships. He spent twelve happy years at Würzburg, and he left it only under pressure in 1900 to fill the corresponding chair in the Bavarian capital. Röntgen was a hard worker, and his papers were numerous and marked by brevity, sincerity, and accurate work. His other contributions to physics, though important enough in their way, were outdistanced by his single great discovery.

Röntgen began serious work on the cathode rays towards the end of October, 1895. Even at that time barium platino-cyanide was in common use as a test for these rays, and he was working with a Crookes tube which was covered with a black paper screen, opaque to all known rays. On Nov. 8, 1895, while he was testing the opacity of this screen, he noticed that some crystals of the fluorescent salt of barium which were lying near were showing active fluorescence. It seems very probable that the discovery of *x* rays at that particular time depended upon Röntgen's reaction to this observation, which must have been made previously by other workers. By moving the crystals outside the range of the cathode rays he at once confirmed the fact that he was dealing with a new kind of ray. By placing various bodies in the path of the rays he showed that their opacity was roughly in direct proportion to their density, and when he placed his hand in the path of the rays and saw the shadow of the bones on the screen of barium platino-cyanide he was quick to realize that by substituting a photographic plate for the screen he could obtain a permanent "shadowgraph" of the interior of human tissues. The first *x*-ray of a part of the body was the photograph of Frau Röntgen's hand. There appears to be no truth in the theory advanced years later by a former student of Röntgen that a series of coincidences presented the discoverer with a shadow-photograph of a key placed between the pages of a book. Röntgen admitted a short time afterwards that he was looking for invisible rays. He prosecuted his discovery with the utmost vigour, and in his first communication "On a New Kind of Rays," completed eight weeks later, he presented a sound description of their properties.

After the announcement of the discovery to the world on Jan. 6, 1896, the "new photography" was taken up widely by medical men, by electrical engineers, and by "straight" photographers. In this country within a week of the announcement the first *x*-ray photograph of a human hand was taken by Campbell Swinton and Stanton. The *Lancet* (Jan. 11, 1896) was the first medical journal in this country to comment on Röntgen's discovery, and in its leading article the wit of Mr. Samuel Weller was invoked to pour a cold douche upon the supposed possibilities. By the following week the *Lancet* admitted that the medical application of the discovery was a shade nearer probability. Meanwhile the *British Medical Journal* (Jan. 18, 1896) came out with a carefully considered and laudatory article by Prof. Schuster, of Manchester, and assessed the new discovery at its proper medical valuation. From that date onwards all journals contained numerous articles on *x* rays and their applications. Too much credit can hardly be given to the early British pioneers for their continuous endeavours to improve *x*-ray plant, to reduce exposure time, and to inaugurate *x*-ray therapy. The policy of this

Journal was also progressive and expectant from the start. As early as the beginning of February, 1896, the *British Medical Journal* appointed Mr. Sydney Rowland, of St. Bartholomew's Hospital, as a Commissioner to report on new developments in *x* rays, and week by week he continued to publish his highly interesting articles. Another original pioneer was John Macintyre, of Glasgow, who not only advanced the boundaries of the art of taking "*x*-ray photographs" of the body but who was also the father of fluoroscopy, of the principles now used in miniature radiography, and of *x*-ray cinematography. There are many others who should have a place in any more extensive list, and our gratitude should also go out to those martyrs whose researches led to their disablement and death.

Röntgen himself was the first to make an *x*-ray photograph of a piece of metal, and this led to the wide industrial uses of the method in metallurgy. Even though we chose to regard his discovery as a logical outcome of the work which had been done by others during the preceding thirty years, it was nevertheless the trigger which released the stream of great discoveries in atomic physics. The work of Becquerel, the Curies, J. J. Thomson, Millikan, and Rutherford built the steps which led, we might almost say inevitably, to the conquest of the atom and the unthinkable possibilities of the atomic bomb.

OPERATIVE TREATMENT OF PROSTATIC CANCER

Before his much-regretted death Hugh Hampton Young, of Baltimore, reviewed[1] the success of his operation of radical perineal prostatectomy as a method of curing carcinoma of the prostate—a review that was timely because of the startling appearance of stilboestrol on the therapeutic stage. Young's results are good: in a series of 184 cases there were only 12 deaths, and nearly 50% of the patients are judged to have been cured, 38 cases having been followed up through periods varying from 5 to 27 years. The paper describing these results is long, and gives in much detail and with good illustrations the steps of Young's operation. The prostate, seminal vesicles, adjacent portions of the vasa efferentia, the lowest part of the trigone, and a portion of the urethra at the apex of the gland are removed, the operation being concluded by the approximation of the bladder to the membranous urethra by sutures, and drainage provided by a urethral catheter. Surgeons who have employed the perineal operations for removal of simple enlargements of the prostate will be well aware of certain advantages inherent in this approach, notably a lessening both of shock and of the liability to pulmonary complications in old men, for often with advancing age the chest no longer expands easily, and tidal air is therefore much diminished when the abdominal respiratory movements are involuntarily limited as a result of surgical incision. But they will also realize that an error in technique during the early stages of the operation may lead to tearing of the rectum, though those who are practised in this method will avoid this without difficulty. A more serious danger belonging to the radical prostate-vesiculectomy is the risk of occluding the ureters by sutures placed too close to them during the reconstructive stage of the operation. Another complication, not so serious but in some ways more disastrous, is that the patient may be left with urinary incontinence. This Young considered to be due to injury to the nerve supply to the compressor urethrae, but to other surgeons it seems possible that it may also result from a drag by the bladder upon this part of the urethra; this, by converting it from a cylindrical form into a funnel-shaped passage, prevents the compressor from acting upon it with full effect. Young stated that he had overcome this difficulty; but the fact remains that, even in his own country, his radical operation is not generally employed, and it seems likely that it is the fear of this complication, productive of so much misery when it does arise, which deters other surgeons from adopting what must certainly be described as an operation of precision designed to cure prostatic carcinoma.

The claim that Young's radical operation really provides a cure has a sound basis in the fact that during its early stages the disease frequently has only a local distribution. If it exists alone it begins in the posterior lobe, and as it develops it spreads upwards beneath the trigone and around the seminal vesicles. If it exists in conjunction with benign enlargement of the gland it may also originate in the posterior lobe, or nodules of carcinoma may be found in outlying portions of the adenomata. Young's operation removes the whole of these tissues included within the anatomical prostatic capsule, and also the anterior layer of Denonvillier's fascia, which for some time constitutes a barrier to the disease. The operation is imperfect when compared, for example, with that for carcinoma of the breast, because it is impossible to remove the pelvic lymph glands which drain this field; and it is imperfect, as all operations for cancer are, because of the possibility that distant metastases may already be present before it is undertaken. To these objections Young replied that his statistics show that his operation does effect a cure in a high proportion of cases. Urologists in this country will not dispute this, but they will ask themselves how often they meet with cases in which the disease is still confined to tissues which can be surgically removed. And here they will come up against Young's statement that "cancer of the prostate occurs in at least 14% of all men past 44 years of age." Will they and general practitioners of long experience accept this dictum? Admittedly cancer of the prostate is occasionally diagnosed when, a supposed adenomatous prostate having been enucleated, the microscope proves certain portions to be malignant. Equally certain is it that careful rectal and bimanual examinations will enable a skilled surgeon to recognize prostatic cancer in the great majority of cases, provided that the patient has symptoms which make him seek medical advice. But the symptoms of this disease are even more insidious than are those of prostatic hypertrophy, and it is the undoubted opinion of British urologists that cases of prostatic cancer commonly present themselves when the disease is far too

[1] *J. Urol.*, 1945, **53**, 185.

widely spread, metastases in bone frequently being present, to be eradicated by any form of operation.

Treatment with stilboestrol has therefore been widely welcomed. Claims for the efficacy of this have been exaggerated, but undoubtedly it often gives relief from symptoms and places a temporary check upon the progress of the disease. As for other attempts to arrest the disease, radium treatment is advocated by some but has not generally met with approval. Technically, the implantation of radium into the prostate can be conducted with precision, but unfortunately the passage of the needles breaches the barriers which confine the disease and malignant emboli are not infrequently liberated. Deep *x*-ray therapy by itself has so far not given much help, though it should be used as an aid in certain circumstances; and so when, in spite of stilboestrol dosage, difficulty in micturition becomes important a choice has to be made from other methods available for relief. The passage of bougies, which avails nothing in benign prostatic enlargement, sometimes suffices to improve micturition in cases of cancer. Permanent suprapubic cystostomy is of proved value, provided the operation is properly performed and the patient trained in the management of his apparatus. But perurethral prostatic resection, when practicable, is the method of choice. It is commonly more easy to perform in cancer than in benign enlargement, for the reason that haemorrhage tends to be less. It does not, as has been stated, hasten death by spreading metastases, and it does not usually need to be repeated. Of course none of these procedures delays the fatal issue due to uraemia, which is so often brought about by the involvement of both ureteric orifices in the upward extension of the growth. Young's operation is designed to prevent this, but cases must be found in a state still amenable to radical surgery, and the patient must be prepared to face the possibility of some imperfection in urinary control.

PHYTIC ACID AND CALCIUM DEFICIENCY

Some twenty years ago Mellanby noted that the addition of certain cereals to diets low in calcium led to severe rickets in growing animals, thus confirming the clinical observation, made in Trousseau's day (1865), that diets consisting largely of cereals, particularly oatmeal, predispose to rickets. It has since been shown that this rachitogenic action of cereals is due to the presence of phytic acid (inositolphosphoric acid), which forms an insoluble compound with calcium in the gut, thus preventing its absorption. Not only is calcium precipitated and lost to the body but also the phosphorus in the inositol and some of the iron present in the gut.[1 2] Phytic acid is widely distributed in foodstuffs, particularly cereals, of which it constitutes from 50 to 70% of the phosphorus. It is therefore easy to understand that a diet mainly of cereals and poor in calcium may cause rickets. Whole-grain flour contains more phytic acid than white flour, and although it contains more calcium and phosphorus than the latter it is an undisputed fact that in the experimental animal it is more rachitogenic. The advocates of the white loaf have therefore argued that flour of high extraction, such as wholemeal or the 85% extraction flour introduced between 1942 and 1944, is undesirable unless fortified with calcium. The objection is largely a theoretical one unless a diet containing much bread and little calcium is consumed. Has it ever been shown that the incidence of rickets is greater in those parts of Europe where whole-grain bread is consumed than in Britain or America, where the bread most favoured is white? Moreover, there is abundant evidence that in whole-grain bread as normally prepared much of the phytic acid is inactivated. When dough is made from flour it is allowed to "rise" for some hours, and Mellanby[3] has shown that the enzyme phytase present in the flour and yeast destroys most of the phytic acid while the dough is rising. This is a practical confirmation of the observation made by Mellanby[4] six years ago that the rachitogenic effect of phytic acid disappears on hydrolysis. It is therefore probable that, under ordinary conditions of baking, brown bread is not appreciably more rachitogenic than white. There are reasons, however, for believing that the rachitogenic properties of oatmeal are retained when it is served on the table. Oatmeal is generally eaten as porridge, and when it is boiled with water the phytase is destroyed before it can inactivate the phytic acid. McCance and Widdowson[5] have also shown that oats contain much less phytase than wheat. Porridge is largely eaten by the lower-income classes, and often with insufficient milk. If it is taken with plenty of milk there is enough calcium in this to offset the rachitogenic action of the phytic acid. It is more than possible that a high consumption of oatmeal with insufficient milk may be associated with rickets in infancy and decalcification in adolescence.

McCance and Widdowson[6] state that when brown bread forms about half the calories of the diet—a very high proportion—calcium absorption is not so good as when an equivalent quantity of white bread is eaten. They recommend the addition of calcium to correct this defect, although Krebs and Mellanby[7] and Cruickshank[8] think that this may not be necessary. What is important is the phytic acid/calcium ratio of the diet as consumed. There is insufficient evidence to prove that brown or high-extraction bread is likely to cause decalcification when eaten as part of a mixed diet containing adequate calcium. When it is eaten in large quantities as part of a diet low in calcium, decalcification can occur. This is particularly true in China and the East, where diets consisting mainly of cereals are thought to be an important contributing factor in the pathogenesis of osteomalacia,[9] which is the adult equivalent of rickets due to calcium deficiency modified by the absence of growth.

CHILDREN WITHOUT HOMES

A special committee of the British Medical Association has prepared a memorandum of evidence for submission to the Interdepartmental Committee on the Care of Homeless Children. The problem of the homeless child and the child separated from its home was examined earlier in the year by a conference of expert practical workers convened by the Women's Group on Public Welfare. Its report,[10] containing seven full-length lectures and notes of discussion, has covered much of the ground, at any rate so far as this country is concerned. As was to be expected, the speakers confirmed and amplified the views set out by the Provisional National Council for Mental Health in its

1 *Lancet*, 1943, **2**, 126.
2 *J. biol. Chem.*, 1943, **147**, 59.
3 *Nature*, 1944, **154**, 394.
4 *Biochem. J.*, 1939, **33**, 1660.
5 *Nature*, 1944, **153**, 650.
6 *J. Physiol.*, 1942, **101**, 304.
7 *Biochem. J.*, 1943, **37**, 466.
8 *Nature*, 1943, **152**, 384.
9 *Chinese med. J.*, 1942, **61**, 61; 1944, **62**, 1.
10 *Children Without Homes*. 1945. London: National Council of Social Service, 26, Bedford Square, W.C.1. 2s.

memorandum on the care of children brought up away from their own homes.[11] Miss L. Rendel, who has done outstanding creative work with the Caldecott Community, estimated the number of homeless children at over 100,000, and declared that little accurate co-ordinated information about their education, treatment, and after-care is available. Many central and local authorities and many voluntary agencies are dealing with them sporadically. Probably none of the many homes considers itself adequate to meet its problems; all suffer from inadequacy of staff both in numbers and in knowledge. Unless the Government establishes some central body, with power to direct and help, confusion may reach a dangerous level. The primary necessity, Miss Rendel held, is that the best method should be sought for each child; schemes must therefore have infinite variety. Any scheme of unification must, she said, include a system of reception or allocation centres to find suitable environments for the children and suggest improvements in existing residential institutions. The adoption system, even under the new Act, leaves much to be desired, and speakers declared that adoption should be arranged only by qualified people and should be far less freely used. Mr. B. E. Astbury, of the Charity Organization Society, regards it as absolutely essential that every unwanted child should become a ward of the State.

The boarding-out of children with foster-parents has definite advantages over other types of care, because it can put the child in a family environment. Children must, however, be placed by skilful, sensible people who can fit the child to the home; supervision must be carried out by people who are able to take an all-round view of the child's life. Miss M. Dyson, of Dr. Barnardo's Homes, laid stress on the psychological testing of foster-home children and the importance of ascertaining the mental defective before he goes out to a family whom he will bitterly disappoint. All workers agree on the paramount importance to a child of home influence. The West Sussex Children's Homes, which are housed in eight cottages and a detached nursery in the midst of fields, give something approaching a real home life, and are especially valuable to children starting out to find their first jobs. Approved schools, at their best, teach boys and girls to become decent men and women and to live with others; they really seem to inspire affection in their charges. In placing children in work vocational guidance is proving more and more valuable, especially if temperament is tested as well as intelligence. Few people realize the great difficulty and importance of after-care for children who have been placed in jobs. Its object, Miss M. Chavasse (also of Dr. Barnardo's) explained, is not merely to keep the children out of prison but to give them the best possible substitute for a parent and a friend who will stick to them through thick and thin.

Staffing in these days is perhaps the most difficult part of the whole problem. Dr. R. E. Lucas, of the Tavistock Clinic, spoke of job analysis, the diagnosis of the individual, and an assessment of his personality trends, but he did not and could not indicate where the candidates were to come from. He did, however, make the important point that to raise the standard for admission to a job does not discourage applicants but attracts a better type of candidate, even if the salary is not raised. He suggested that some central body should conduct a recruiting campaign, and that the various organizations should appoint a matron and a medical psychologist to advise organizations and authorities over a wide area. The training of staff, according to Miss A. A. M. Wilson, who spoke for the Associated Council of Children's Homes, should aim at helping the students to know and understand more about children themselves and society, to deepen their experience of spiritual truth, and to bring to them the importance of presenting to the children the right kind of life, and living it. The Government has recognized the need for concerted action by appointing the Interdepartmental Committee between the Home Office and the Ministry of Health, to which the B.M.A. is offering expert evidence from the medical point of view. The problem of children deprived of a home or parental care is far too urgent to be shelved any longer.

[11] *British Medical Journal*, Sept. 22, 1945, p. 394.

VAGOTOMY FOR PEPTIC ULCER

Since it is generally admitted (1) that most gastro-duodenal ulcers are associated with hypersecretion of gastric juice, (2) that psychological factors are important in exacerbating ulcer symptoms, (3) that peptic ulcers may arise in experimental animals, and sometimes clinically in man after lesions of the vegetative centres in the hypothalamus, and (4) that the vagi are the extrinsic secretory nerves of the stomach, it would seem logical to examine the effect of operative division of the vagi in patients suffering from peptic ulcer. The vagi are accessible where they lie on the oesophagus at its emergence from the thorax into the abdomen, but their arrangement at this level is rather variable; certain gastric branches have already separated, a plexiform arrangement of multiple cords may replace the two main trunks, and operative intervention seldom effects a complete vagal denervation of the stomach. The alternatives are to divide the gastric nerves peripherally as they approach the curvatures, and to divide the main vagal trunks within the chest. Dragstedt and Schafer[1] have adopted the latter method in thirteen patients with duodenal ulcer, one patient with gastric ulcer, and one patient with jejunal ulcer. After extensive resection of the seventh or eighth rib and cartilage on the left side the left lung is mobilized by ligation and division of the inferior pulmonary ligament, and retracted upwards by a round broad-bladed retractor. The pleura over the lower 10 cm. of the oesophagus is opened, and the oesophagus is mobilized and elevated outwards. Both main vagus trunks and all separate nerve cords on the surface of the oesophagus are identified without difficulty, ligated, and divided. The proximal ends of the divided nerves are then sutured to the pleura to prevent regeneration, the oesophagus is replaced in its bed, the pleura is sutured, and the wound is closed without drainage. The patient begins to get up twenty-four hours after operation.

The patient who had suffered from gastric ulcer was apparently entirely cured, as judged by relief of symptoms and disappearance of skiagraphic and gastroscopic signs. The patient with jejunal ulcer, though improved, has continued under medical management. All but one of the patients with duodenal ulcer were improved or cured. Three patients developed signs of gastric stasis after the operation, and one of these proceeded to an acute dilatation of the stomach; all three were relieved by gastro-jejunostomy. This, the only serious disturbance in the physiology of the vagotomized stomach, is doubtless due to the removal of the evacuant vagal function. In all cases the excessive continuous night secretion of gastric juice was much reduced by vagal section. It is not stated whether the patients who were cured or relieved remained symptom-free under normal civilized conditions of diet, environment, and employment, and to what extent they tolerated, after operation, the fatigue, anxiety, overwork, and irregularity of diet which the normal healthy adult expects to support without symptoms of dyspepsia. That the standards of cure approached this exacting criterion, which must be the aim of treatment in gastro-duodenal disease, is suggested by the statement that only one patient

[1] *Surgery*, 1945, **17**, 742.

remained under medical management. The authors conclude that "the striking improvement in these patients is in harmony with the view that gastro-duodenal ulcer is a psychosomatic disease, and that the central nervous system affects the stomach via the vagi, probably chiefly through greatly augmenting the secretion of gastric juice."

THE ANTINARCOTIC CAMPAIGN IN EGYPT

Sir T. W. Russell Pasha, Director of the Central Narcotics Intelligence Bureau, in his report for 1944 to the Egyptian Government reviews with well-merited satisfaction the achievements of the Narcotics Bureau during the sixteen years of its existence. When the crusade against the illicit traffic was started "the country was in what seemed to be an almost hopeless state of addiction to heroin." The seizure of heroin in 1944 amounted to 1½ grammes, compared with 80,000 grammes in 1929. This "happy immunity" is, however, partly attributable to the wartime closure of Egyptian ports to sea-borne drug traffic, but also in large measure to the work of the League of Nations in securing international control over cultivation and trade in opium as "the basic source of most of the habit-forming drugs." While the heroin problem has diminished, the seizures of hashish have, however, gone up during the last five years to an annual average of 1,688 kilos, against 723 kilos in 1939, and the seizures of opium increased by 40% in 1943. These drugs are smuggled into Egypt through a hundred-mile strip of desert which is constantly crossed by streams of military vehicles whose drivers, of many nationalities, make money by lifting the goods across the frontiers. Most of the hashish seized is grown in the Lebanon and Syria, but opium seized in Palestine after transit through Syria and the Lebanon must have come from outside. The Director is concerned about the future of alkaloid factories in the Balkans and Central Europe as sources of contraband traffic, and has received assurance that Allied control will at once be placed on these avenues of illicit trade as occupation is effected. As to the relative evils of hashish and opium addiction no doubt is entertained that while the former "are harmful the latter are deadly"; moreover, the danger is "that hashish and opium addiction predispose to heroin addiction." While in 1944 some 1,000 acres of cannabis were pulled up and 50 tons of hashish burnt, the bulk of the remaining 30 tons entered the Egyptian market, representing £E6,700,000 in the wholesale. As the report concludes, "the squandering of these vast sums of Egypt's money in smokers' dreams can only be considered a national calamity."

LIGATION OF PATENT DUCTUS

During the last few years the surgery of the heart has made remarkable progress. One of the most interesting developments is ligation of the patent ductus arteriosus. Rae Gilchrist[1] has reported 14 cases, Geoffrey Bourne[2] 11, Terence East[3] 13, and Holmes Sellors[4] 10. Cases of patent ductus arteriosus may be divided into two groups: the infected and the uninfected. In probably about half, and perhaps more, of those patients who die from the defect the ductus is infected.[5] But the chances of cure of an infected case by ligation are good, a survey of the various series showing that about two out of three are saved. There are clear reasons why operation may fail to cure. There is always the possibility that the pulmonary valves, or the aortic and mitral valves, may become attacked. Ligation of a ductus full of clot may fail to close it. The patients are sometimes very ill and there may be infarcts in the lungs. No doubt early diagnosis of infection and prompt treatment offer the best chance of success. Perhaps penicillin will prove to be useful in these cases, for the results of the treatment of early cases of bacterial endocarditis are encouraging; at present there can be little doubt that surgical treatment of an infected ductus should be undertaken as soon as possible.

Patients who have not become infected may have ligation done to protect them from infection, and also from the possibility of heart failure. A patent ductus has a variable effect on growth and development. Some children grow up well and healthy; others are weedy, stunted, and backward; and the ultimate prognosis, apart from the risk of infection, cannot be good, for it is rare to meet with cases after middle age. Apart from this, the presence of such a lesion will debar the owner from life assurance, many avenues of employment will be closed to him, and his life will probably become more and more restricted. To be able to eliminate all these disadvantages with a minimum of risk is certainly desirable. The risks of operation seem to be quite small. Haemorrhage and infection have been recorded, and in some cases ligature appears to have been ineffective; but these technical difficulties should disappear in time. A small effusion may form, a small pneumothorax may be left, or there may be a certain degree of collapse of the lung: these soon clear up with breathing exercises. Children between the ages of 6 and 12 tolerate the operation extremely well. Later on, the enlargement of the pulmonary artery may introduce difficulties and the ductus may be very short; the operation also causes more disturbance. In adults cardiac embarrassment would be an indication for operation. Probably the best time for surgery is soon after the sixth year, when the operative disturbance is relatively slight, and a lesion can be removed which may impair growth and development and incur the grave risk of infection. The immediate benefit in some children may be most striking.

[1] *Brit. Heart J.*, 1945, **7**, 1.
[2] Ibid., p. 91.
[3] Ibid., p. 95.
[4] *Lancet*, 1945, **1**, 615.
[5] Keys, A., and Shapiro, M., *Amer. Heart J.*, 1943, **25**, 158.

NOBEL PRIZE FOR MEDICINE

It was announced in Stockholm on Oct. 25 that the Nobel Prize for Medicine for 1945 has been awarded jointly to Sir Alexander Fleming, F.R.S., F.R.C.P., F.R.C.S., professor of bacteriology, University of London, at St. Mary's Hospital Medical School; Sir Howard Florey, Ph.D., M.B., F.R.S., professor of pathology in the University of Oxford; and Dr. Ernst Boris Chain, lecturer and demonstrator in chemical pathology in the University of Oxford. This award is made by the Karolinska Institute for the discovery of penicillin and its healing effects. The Institute recognizes Sir Alexander Fleming as the real discoverer of penicillin in 1928, and praises Sir Howard Florey and Dr. Chain for exploiting his discovery by experimenting with its effect upon mice to the advantage of humanity. Penicillin, the announcement says, has rendered mankind one of the greatest services. It was in 1938 that a team of research workers at the Oxford School of Pathology began their investigations on the therapeutic uses of penicillin. The Nobel Prizes are awarded from a fund bequeathed by Alfred Nobel, who died in 1896; no awards were made for the years 1940, 1941, and 1942.

The Council of the Royal College of Surgeons of England is prepared to consider applications from demobilized officers for assistance in the completion of research work on which they have been engaged while serving in the Royal Naval, Army, or Royal Air Force Medical Services.

A NOTE ON DIPHTHERIA INCIDENCE IN CERTAIN EUROPEAN COUNTRIES

BY

G. STUART, O.B.E., M.D.

Health Division, European Regional Office, U.N.R.R.A.

England and Wales

In England and Wales diphtheria morbidity and mortality have alike shown a spectacular decline within recent years. The year 1944 provided the lowest incidence and mortality ever recorded; and this gratifying state of affairs is to be traced to mass immunization of children against diphtheria, which, begun in 1940, has since continued without interruption. Between 1940 and 1943 no fewer than 4,829,115 children under 15 years of age had been immunized—the estimated population of those ages in 1943 having been 8,583,000. Analysis of the returns made for 1943 shows the following rates:

Annual rates of incidence per 1,000 child-years:	
(*a*) In immunized children	1·16
(*b*) In non-immunized children	4·06
Annual rates of death per 1,000 child-years:	
(*a*) In immunized children	0·0104
(*b*) In non-immunized children	0·260

The estimated death rate in 1943 from diphtheria was about 25 times as great among the non-immunized as among the immunized. In the two years 1942 and 1943 the ratio was about 23 to 1.

But England's experience in this respect has not been paralleled by that of many other European countries, certainly not in France, Germany, Belgium, the Netherlands, and Norway. Of all the communicable diseases, diphtheria has shown in those countries by far the greatest increase during the war period; and this increase has been greatest in countries—e.g., the Netherlands and Norway—where the disease had in pre-war years reached the lowest level and where in consequence the proportion of susceptible individuals was highest.

France

In France, despite the proportion of children of school age inoculated against diphtheria with Ramon's diphtheria toxoid, a very considerable incidence was observed each year—an incidence which has become significant since 1941. Thus, whereas the average annual incidence during the 11-year period 1928–38 was 19,371 cases (maximum 23,714 in 1930 and minimum 16,264 in 1936) and the median for the same period was 19,893, the number of cases, which had dropped to 14,019 in 1939 and to 13,568 in 1940, rose steeply to reach 46,539 in 1943—i.e., an increase in the morbidity rate per 100,000 from 32.3 (in 1940) to 110 (in 1943). The first half of 1944 provided 22,179 cases, as against 22,957 in the corresponding 6 months of 1943; thus showing little reduction from the abnormal increase of 1943. During 3 months of the latter half of 1944—from August to October—the number of cases fell to 6,030, as against 10,025 in the same period of 1943. Thus 9 months of 1944 yielded 28,209 cases, as compared with 32,982 in the corresponding 9 months of 1943, and with the median figure of 14,083 for the same period. The 1944 incidence in France has therefore been twice as great as in ordinary years, and the morbidity rate per 100,000 has been 90, as against 110 in 1943 and 32 in 1940.

As regards mortality, the proportion of deaths to cases would appear to have remained unaltered. In this connexion the mortality rates per 100,000 inhabitants of certain French towns during 1938 are of interest:

Town	Mortality Rate per 100,000	Town	Mortality Rate per 100,000
Bordeaux	1·9	Montpellier	3·3
Dijon	2·1	Nancy	3·6
Lille	6·5	Nantes	1·0
Lyons	3·2	Paris	2·5
Marseilles	4·7	Saint-Etienne	10·0

Greater Germany

In Greater Germany the number of cases in the first 40 weeks of 1944 is stated to have been 204,361, as against 197,831 in the corresponding period of 1943. This increase proves that the incidence, which has been progressively rising since 1939, is continuing on a still higher level. In the 11-year period 1928–38 the annual median was 78,452 for the Altreich, but epidemic peaks had been observed in 1928–9 and in 1935–7. The occurrence in the Altreich of 446,333 cases in the 3-year period 1936–8 had already placed diphtheria among Germany's major public health problems, but the position in the succeeding 5 years was aggravated in the territory by a rise from 143,584 in 1939 to 238,409 in 1943. In Greater Germany between 1939 and 1943 the incidence rose from 174,891 to 196,568 cases. As in other countries, distribution has been unequal; thus whereas the incidence was relatively low in Hamburg, Oldenberg, Bremen, Brandenburg, Württemberg, and Baden, it was high in East Prussia, Saxony, Silesia, Anhalt, Westphalia, and Bavaria.

As regards case mortality, the percentage fatality between 1934 and 1938 was respectively 4.6, 4.7, 3.8, 3.7, and 3.5. In 1939 it was 5%. In 1944 the case mortality rose to over 6%—thus showing an increase of 70% between 1938 and 1944; and it may be confidently asserted that, in view of the very large number of cases under consideration, the increase can scarcely be regarded as accidental.

In the Altreich, morbidity rates have risen during the past 5 years from 180 in 1939 and 174 per 100,000 in 1940 to over 300 in 1943 and 1944; while in Greater Germany the corresponding rates have been respectively 184, 179, and 315 per 100,000.

The severity of the type of diphtheria in Germany is further reflected in the fatality rates per 100,000: (*a*) in the Altreich between 1936 and 1939, and (*b*) in the Grossreich between 1940 and 1944.

Mortality Rates per 100,000 between 1936 and 1944

Altreich		Grossreich	
Year	Rate per 100,000	Year	Rate per 100,000
1936	9·3	1940	9·0
1937	8·4	1941	11·0
1938	8·4	1942	15·5
1939	9·3	1944	18·0

The reason underlying the high morbidity in Germany and its incorporated territories is largely determined by the absence of any nation-wide policy of immunization comparable to that so successfully applied in Great Britain. On the other hand, a large-scale campaign was introduced in the pre-war period in Western Germany, while an increase in diphtheria morbidity and mortality has since led the Reich and Prussian Ministry of the Interior to approve immunization in those parts of Germany particularly affected. Moreover, immunization is compulsory for all youths at the beginning of their Landjahr—i.e., their year of agricultural service.

Belgium

In Belgium, incidence—which had risen alarmingly from 2,419 cases in 1939 (and a yearly median of 2,089 cases) to 16,072 cases in 1943—showed a decline after the first quarter of 1944. As a result the total incidence in the first 11 months of 1944 was but 6,112 cases, as compared with 13,681 in the corresponding period of 1943. The following tabular statement provides figures to illustrate the trend quarter by quarter in 1943 and 1944.

Diphtheria Incidence in Belgium by Quarters, 1943–4

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter (2 months)	Jan. to Nov.
1943	3,085	2,885	3,621	4,090	13,681
1944	3,373	1,398	647	694	6,112

The importance of the diphtheria impact on Belgium will be appreciated from the fact that between 1928 and 1938 the average number of cases annually reported was 2,111, while the average number of deaths from diphtheria was no less than 446 yearly during the same period. The subjoined table shows for the period 1930–8 the number of cases and deaths, morbidity and mortality rates per 100,000 inhabitants, and the percentage of case mortality. Morbidity and mortality rates have been calculated on a population increasing from 8,092,000 in 1930 to 8,386,000 in 1938.

Diphtheria in Belgium, 1930–8

Year	No. of Cases	Morbidity Rate per 100,000	No. of Deaths	Percentage Case Mortality	Mortality Rate per 100,000
1930	2,848	35·2	505	17·7	6·2
1931	2,016	25·0	455	22·0	5·6
1932	2,265	28·0	464	20·4	5·8
1933	2,169	26·2	470	21·2	5·8
1934	2,339	28·2	382	16·3	5·7
1935	1,780	21·4	384	21·5	4·6
1936	1,916	22·8	377	19·6	4·5
1937	2,090	24·8	476	22·8	5·7
1938	2,572	30·7	499	19·4	5·9

In 1940 the incidence rose considerably; in 1941 it was already twice the average (with 4,271 cases); and 1942, with the still higher incidence of 5,464 cases, paved the way for the explosive outburst of 1943, which provided 16,072 cases—an incidence nearly 8 times the average. The year 1944 saw a continuation of epidemic prevalence only until March, since when the curve of the incidence has fallen rapidly. November, with 447 cases, showed an incidence about one-fifth that of Nov., 1943, but one still nearly twice the normal.

It is of interest to compare the mortality of 1921 with that obtaining within recent years; in 1921 there were 884 fatal cases—representing a mortality rate of 11 per 100,000, as against the 6 reported to-day. It is stated that the mortality rate for children beween the ages of 1 and 15 years was 34.6 per 100,000 in 1910, as against 20.3 between 1929 and 1931 and as compared with 15.0 in the Netherlands. In this connexion also the 476 diphtheria deaths in 1937, which represent an overall mortality rate of 5.7 per 100,000, have to be contrasted with the Netherlands rate of 1.4 in the same year.

As regards prophylaxis, immunization with Ramon's antitoxin has been fairly widely attempted, but is not compulsory.

The Netherlands

Caught up in the epidemic wave which swept over Western and Central Europe during 1942 was also Holland, from which country the wave shows even now little sign of receding. In a country where incidence during the 11-year period 1928–38 averaged 3,700 cases annually and deaths from diphtheria 210, the number of cases, which in 1939 had reached the low figure of 1,273 (14.7 per 100,000 inhabitants), totalled 5,501 in 1941, 19,527 in 1942, and 56,603 in 1943—representing morbidity rates per 100,000 of 63.6, 226, and 655. The 1943 incidence was thus 44.5 times greater than that of 1939 and 15 times the 1928–38 annual average. It is somewhat difficult to estimate the 1944 trend of the disease, as statistics are far from complete. The occurrence of 20,669 cases in the first quarter alone, however, showed that the epidemic had reached new heights, the incidence having been nearly twice that of the corresponding quarter of 1943. Moreover, that the incidence continued on this unprecedented high level during the second quarter is proved by the following returns: April (3 weeks), 3,938 cases; May (2 weeks), 2,262 cases; and June (complete), 4,293 cases. It would be safe to assume that the second quarter yielded, therefore, about 14,068 cases, making the first half-year's total 34,737, as against 19,627 in the corresponding half of 1943. July provided 3,674 cases and August (3 weeks) 3,182, as against 2,658 and 3,466 in the complete months of July and August in 1943.

Although figures have not been made available since Aug. 20 it is evident that 1944 has provided an even greater diphtheria problem than did 1943. With some 43,654 cases in the first 8 months and incidence during the remaining 4 reported as being not less than in 1943, it would appear that 1944 constituted the peak year of the war period.

In explanation of the ravages made by diphtheria in the Netherlands it has been advanced that the immunization programme, which in respect of school-children was formerly widespread but not universal, was not carried out during the war years. Thus two-thirds of the children from 6 months to 12 years of age in the liberated areas of Holland have not been immunized against diphtheria. (A new immunization campaign, however, has now been started.)

During the epidemic years it is noteworthy that the case *fatality rate* has not increased—remaining, as in non-epidemic times, somewhere between 4.5 and 6.9%. Thus the case mortality rate in Holland is similar to that in Germany, but much lower than that in Belgium.

The following table shows the distribution of diphtheria in the four provinces of Limburg, Zeeland, Noord Brabant, and Gelderland during the years of occupation.

Diphtheria in Holland, 1940–4

Province	Population	Number of Cases				
		1940	1941	1942	1943	1944
Limburg	653,000	681	2,322	3,699	4,311	1,793*
Zeeland	254,000	9	35	333	965	493†
Noord Brabant ..	1,103,105	436	1,308	2,872	2,798	1,612†
Gelderland ..	993,000	139	515	2,434	5,676	3,578*

* To September. † To August.

In the year 1943, in respect of which complete returns are available, the morbidity rates per 100,000 are thus shown to have varied widely, but in all cases to have been extremely high—viz., Limburg, 660; Gelderland, 572; Zeeland, 380; Noord Brabant, 254.

Norway

Norway in 1939 had but 54 diphtheria cases; in 1943 it had 22,787. Thus with a morbidity rate per 100,000 mounting within 5 years from 1.8 to 760, Norway has earned the unenviable distinction of being the most intensely infected country during the worst diphtheria wave Europe has experienced in 50 years. Now, diphtheria incidence in Norway had been decreasing regularly during the decade immediately before the outbreak of World War II; and, because it was not considered necessary, immunization had not been carried out. But after the German occupation of the country the whole picture changed dramatically, apart from the fact that clinically the disease would not appear to have been more malignant than before, the case mortality still varying between 3.4 and 6.9%. In the autumn of 1941 diphtheria broke out in epidemic form, with the result that by the end of that year 2,611 cases had been reported, as compared with 138 in 1940. In 1942 the disease took heavy toll of the susceptible population, and 8,349 cases were notified—the incidence having been some three times higher in the towns than in the rural areas, and especially high in Stavanger. During this period the extension of diphtheria was mainly from the ports towards the interior and from the south northward. In 1943, when with 22,787 cases the overall morbidity rate of 760 per 100,000 had been reached, the incidence was no less than 3,400 per 100,000 of children under 15 years of age—the highest recorded in Europe during the war. Indeed, the only comparable attack on child life experienced in this war epidemic was in the Netherlands, where during the 3 years between April, 1941, and March, 1944, 102,726 diphtheria cases were reported among a population of 8,640,000, of which about 2,500,000 were under the age of 15 years. From this it emerges that during the 3 years under review as many as 4% of the child population in Holland between 1 and 15 years fell victim to the attack. In Germany the incidence among children under 15 years of age during 1943 was one-half that encountered in Norway in the same year.

After incidence began to rise in so alarming a fashion, active immunization is stated to have been made compulsory for school-children in Oslo and in many other cities, yet in 1942 only 15,000 were reported to have been thus protected. The temporary lack of toxoid was the reason assigned for so unsatisfactory a result of the immunization campaign. In any case, the campaign was launched too late to arrest the outbreak in its early stages.

As regards 1944, statistical data are incomplete. The disease would, however, appear to have declined somewhat, although in the first quarter of the year 4,884 cases were reported, as against 4,391 in the corresponding quarter of 1943. In the second quarter 1944 produced 3,215 cases; 1943 in the same period had 4,017; while the combined incidence of July and August in 1944 totalled but 1,321 cases, as against 3,410 in the corresponding 2 months of 1943. Thus in 1944 between January and August there were 9,440 cases, as compared with 11,908 in the same 8 months of 1943; the incidence, therefore, was still 18 times higher than the median (521).

Observations

From 1941 there has been in Northern and Central Europe an increase in diphtheria incidence unparalleled since control of the disease became possible.

Diphtheria has proved to be the leading epidemic war disease on the European continent, both in morbidity and in mortality.

Only in such countries as have pursued a vigorous immunization campaign over a period of years has a reduced incidence been observed.

The continued high incidence, with a proportionate increase in the number of carriers, places diphtheria high on the list of post-war problems in Germany and the liberated countries of the north and west.

PUBLIC HEALTH'S DEBT TO EXPERIMENTAL RESEARCH

LECTURE BY SIR WILLIAM SAVAGE

The Research Defence Society on Oct. 12 resumed its series of annual Stephen Paget memorial lectures, which had been interrupted by the war. This, the fourteenth, lecture was given by Sir William Savage, lately County M.O.H. for Somerset and a former president of the Society of Medical Officers of Health. He took as his subject "Public Health and its Debt to Experimental Medical Research." The chair was occupied by Lord Hailey, president of the Society.

Sir William began by pointing out that public health was not a pure science, or indeed a science at all; it embraced the application of all scientific knowledge which might be turned to its purposes. The chief contributing sciences to public health had been bacteriology, physiology (including biochemistry), and, to a less extent, chemistry. The development of many sciences, particularly physiology and bacteriology, had depended mainly upon experimental research requiring animal experiments, and many of the striking advances in public health merely reflected this knowledge as applied administratively. The whole of the indebtedness of public health to experimental medical research could not be comprehended in a single lecture; therefore he took some illustrative examples.

Control of Acute Infectious Diseases

Control over acute infectious diseases was rightly placed in the forefront of the work of a medical officer of health. Such control depended for its success upon the application of precise knowledge of causation, methods of dissemination of organisms responsible, control over spread of infection, and application of methods of immunization. Until bacteriologists and epidemiologists had established the factors concerned in this spread satisfactory progress was impossible. This potent weapon of accurate knowledge was largely due to bacteriology, and had been forged by laboratory workers with animal experiment as the necessary tool.

We now know enough to control the majority of infectious diseases, but to apply such knowledge was not always possible, and sometimes not worth while because of complicating social questions such as interference with the liberty of the subject, the reluctance of many persons to respond to preventive measures, and the likelihood that the inconveniences of control would loom larger than the damage resulting from infection.

His first example of a controlled disease was the enteric fevers. Deaths from typhoid and paratyphoid fevers numbered 371 to the million of population in 1871–5, and fell to 67 by 1911, and to 3 in 1939 and 1940. The initial decline was largely due to improved water supplies and sewage disposal. Meanwhile, field investigations and bacteriological studies showed infected shellfish and milk to be important conveyers of infection; but, while the vehicles were recognized, only rarely could the reservoir of infection and the path from reservoir to vehicle be traced. This knowledge presently emerged as the result of direct bacteriological studies which demonstrated that a material proportion of cured cases continued to harbour the typhoid bacillus and became chronic carriers. It thus became clear that, apart from direct contact infection, the chronic carrier was the key to the infection of new cases, though in paratyphoid fever the chronic carrier was often less important as an agent of spread than the symptomless recently infected person. It was also shown that food such as cream and milk was much more to blame than water as a disseminator of infection.

Recently it had been recognized that both typhoid and paratyphoid bacilli were not one and indivisible, but included a number of types to be differentiated by phage typing, thus enabling the association of a particular outbreak with infection from a carrier to be demonstrated with accuracy. Here Sir William Savage referred to the work of Bradley[1] in tracing the relationship of 22 cases, mostly in Buckinghamshire, notified over two years. These proved to be all of phage type D (an uncommon type), and all were directly traced to a milk producer who was a persistent typhoid carrier on a farm in Wiltshire, a hundred miles from the main cases in Buckinghamshire, the vehicle being milk.

Immunization against Diphtheria

Diphtheria illustrated a different point. Here, while there had been a marked decline in case mortality, until quite recently there had been no serious decline in prevalence. The deaths per million over the period 1856–65 were 247, gradually falling to 120 in 1910, to 88 in 1930, and to an average of 66 in 1936–40. The control covered three stages. The first stage was the recognition of the disease as a clinical entity, without any great knowledge as to its spread and with no specific method of treatment. The second stage started in 1894 with the introduction of diphtheria antitoxin and by the recognition that the usual method of spread was from case to case and could partly be controlled by swabbing and by other methods founded on bacteriological knowledge. Antitoxin, imperfectly used as it was at first, dramatically reduced case mortality. In Metropolitan Asylums Board hospitals the case mortality, which had ranged from 33 to 22 in 1890–5, had fallen to between 8.6 and 5.0 in 1920–5, and the greater part of this decline was due to the use of antitoxin; there was still no corresponding reduction in prevalence. The third stage was the introduction of specific immunization. This was introduced in 1926 in the U.S.A. and Canada, but in this country it had been widely practised only during the recent war. Sir William showed a table of the Canadian figures. In 1901 the deaths per 100,000 population were 35.4, and in 1920 they were still 25.7; in 1925 they were 8.1, and fell steadily until in 1940 they stood at 0.3. The incidence, which was as high as 205 per 100,000 population in 1920, was for the years 1938, 1939, and 1940 respectively 6, 4, and 2.

While efficient immunization protected the individual almost completely, statistical evidence of a general reduction in incidence was unlikely until a material proportion of the susceptible (school and pre-school) population—said by some authorities to be 50%, but he believed it to be higher—was protected; so that it was rather early to look for significant reductions in Great Britain, but the available figures were encouraging.

An Uncontrolled Disease

The lecturer's final example was whooping-cough, chosen as an illustration of the extent to which control depends upon having effective tools. Whooping-cough had been notifiable only for the last few years, so that exact figures of prevalence were not to hand; but there was little evidence of any decline in incidence. As a result of much greater care in management the deaths per million had declined from about 500, at which they stood in 1860–90, to below 100 from 1923 onwards. Deaths per million at ages 1 to 5 still remained considerable. The bacterial cause had been known for nearly forty years, but whooping-cough was so difficult to diagnose before spread of infection had taken place that it was doubtful whether control by ordinary measures was practicable. General immunization would not be worth while; on the other hand, immunization of children under 5, and especially under 2, would eliminate nearly all deaths and the bad after-effects. For this purpose a process of immunization was needed which was both effective and easy to operate.

These three diseases—the enteric fevers, diphtheria, and whooping-cough—illustrated contrasts. The first of the three

[1] *British Medical Journal*, 1943, **1**, 438.

was much reduced by general environmental means, but only up to a point; and continued progress depended upon accurate bacteriological knowledge and its application. Diphtheria responded not at all to measures of general sanitary improvement, and the whole cycle of control, reduction in case mortality, and final elimination turned entirely upon scientific knowledge largely gained from animal experiment. Whooping-cough was not controlled, and offered the prospect of a great reduction in child mortality only when the present valuable work on immunization became administratively practicable on a large scale.

Environmental Improvements

How far were the more favourable health statistics due to general improvement in environmental conditions? When the Public Health Act, 1875, was passed, they were so deplorable that the primary need was to eliminate or improve them by purer water supplies, safe drainage, better food control, improved housing, and a higher living standard, all of which paid handsome dividends; but the stimulus to improvement, and to some extent the line the improvement took, were in large part derived from the growth of scientific knowledge, particularly of bacteriology. A study of public health legislation showed it to be recognized that as the grosser conditions were eliminated the dividends earned were reduced, so that further advances were associated with the application of exact knowledge to particular problems. This was well illustrated by two conditions specially susceptible to environmental improvements—namely, tuberculosis, and the group of conditions included under infant and maternal well-being.

The incidence of tuberculosis was much influenced by environmental factors, but problems connected with direct bacterial infection were also of supreme importance. Tuberculosis was influenced by two factors—the resistance of the individual and the invasive properties of the organism. Resistance was fortified by adequate nutrition, prevention of debilitating infections, and other factors, while invasion by the tubercle bacillus was greatly reduced in potency by keeping the dose of infection low. Hence the need for isolation of advanced cases, removal and treatment of active infective cases, and education of patients at home in anti-infective precautions. The decline in tuberculosis mortality was perhaps the most striking statistical fact in relation to public health.

Infantile Mortality

Again, the decline in infantile mortality in recent years was associated with better environment, but not with improvements in general sanitation. It was localized environment which had improved, and the mortality rate might be low even with bad sanitary conditions. There had been no marked decline in infantile mortality until after 1900, and it was quite unaffected by the bettering of the sanitary conditions which took place before then. The protected environment was one which shielded the infant from the various bacterial infections, especially those affecting the gastro-intestinal and respiratory tracts. The way to bring this environment into being was to be deduced directly from bacteriology and experimental research. It was true that the faulty general environment made control more difficult, but it was ancillary only, and its improvement alone was ineffective.

The downward trend of maternal mortality had been in evidence only since 1936, and was attributable to various factors—but, so far as puerperal sepsis was concerned, largely to the use of sulphonamide drugs and to a better knowledge of the bacterial causes and the practicability of excluding infection.

In concluding this part of his lecture Sir William Savage said that future progress in preventive medicine depended upon the collection and use of knowledge as to all factors which affected health. The two main sources for the acquisition of such knowledge were investigations in the sociological field based upon detailed comparative statistics, and, in the second place, the exercise of the experimental method. Both were valuable, and neither could be neglected without loss. The field method, however, had the disadvantage that there were too many variables, while experimental research could be freed from a multiplicity of variables, though it was limited in certain respects.

Control over Food Supplies

In the early days of public health, control over food supplies was based upon the prevention of chemical adulteration, better standards of cleanliness, and the elimination of gross pathological conditions. But it was soon evident that further progress could result only from the application of exact knowledge, much of it bacteriological. Sir William illustrated this by considering the diseases associated with milk and the problem of food-poisoning. About 40% of milking cows were affected with tuberculosis. True, only about 1% were excreting tubercle bacilli into the milk at any one time, but this involved an infection of the milk supply of from 5% to 7%. In 1929, when he compiled his book *The Prevention of Human Tuberculosis of Bovine Origin*, the number of deaths due to bovine tuberculosis was about 2,000 annually; it was now probably from 1,500 to 1,600. A good illustration of the value of experimental research in public health was the relationship of mastitis in cows to human infections. Acute and chronic mastitis was one of the commonest infections of the cow. There was a glaring discrepancy between the prevalence in cows and the rarity of infection in man, and it took him three years, using goats, to work out the relationship. He was able to show that the type of streptococcus which was the ordinary cause of bovine mastitis was harmless to man, and that the infections which caused human disease were associated with implantation of a pathogenic streptococcus of human origin in the cow's udder—a relatively uncommon mishap. He mentioned this as a comparatively clear-cut instance of the value of experimental research in clearing up public health obscurities.

In pre-bacteriological days there was no scientific knowledge of the causes of food contamination, and such scanty control as there was was exercised along wrong lines. The elucidation of the various bacteriological and chemical causes of food-poisoning had been mainly a laboratory affair, and would have been impossible without extensive animal experiments. It was now known that bacterial food-poisoning was not a problem of tainted or incipiently decomposing food, but was due to infection of food with specific organisms, such as the Salmonella group. With this knowledge the reservoirs of such organisms could be studied, as well as the paths by which they passed from the reservoirs to the food vehicles. Armed with these facts, it was possible largely to eliminate this type of food-poisoning. Thus food control, as a result of these investigations, had been removed from empirical guidance based upon the physical senses to a scientific foundation.

Experiments in Nutrition

Only during the last two decades (Sir William continued) had the paramount importance to public health of a sufficiency of basic foods been realized. This had come about along two lines of inquiry. The first was the discovery of vitamins and the recognition of their influence upon the health of man and animals. The basis of this knowledge was prolonged animal experiments. Concurrently with this laboratory work, public health field studies had demonstrated, on the one hand, that many people were not receiving even the minimum daily intake of essential foods, and, on the other hand, that this deficiency manifested itself in the development of pathological conditions such as rickets or simple goitre, and, less patently, in diminished resistance to infection. Field experiments had also proved that what had been regarded as good nutrition was not full nutrition, and that by the addition to the diet of selected foods rich in accessory substances children increased in height and weight and also improved in mental qualities. This optimum nutrition was being translated into administrative action in milk schemes for schools and in the provision of additional milk and accessory foods for expectant and nursing mothers and young children.

In conclusion, Sir William said that our community was now on the threshold of a third phase in the development of preventive medicine. The first phase was the drive towards environmental improvement; the second was largely one of attack on special diseases or conditions. The widening knowledge now permitted the passage of a third phase, which had as its aim the prevention of deviations from health from whatever cause. Such a new orientation implied that a full study of the causation of all diseases was within the scope of

preventive medicine. This was an enormous claim which demanded better machinery of investigation, such as reliable morbidity statistics and accurate records of illnesses, close collaboration with medical practitioners, and detailed studies in workshops as well as in homes.

"Augustus found Rome of brick and left it marble. Much of public health is still of brick, but its foundations are well and truly laid. Give us the stones—in the findings of experimental research—and we will turn the structure to dazzling marble."

A vote of thanks to Sir William Savage was carried on the proposition of Prof. A. V. HILL, seconded by Major Gen. H. MARRIAN-PERRY.

TRAINING AND QUALIFICATIONS OF DIETITIANS

MEMORANDUM FROM NUTRITION SOCIETY

In July, 1944, a Special Planning Committee was set up by the Nutrition Society (English Group) to consider and report on the training of persons in charge of the provision of food in institutions, industrial canteens, hospitals, etc. The committee has summarized its findings in the subjoined memorandum, but one of its members (Miss M. Grant) has dissented from paragraph 1 (concerning membership of the British Dietetic Association and registration as medical auxiliaries). The memorandum is published by the Planning Committee with the consent of the committee of the English Group of the Society, but it should not be regarded as necessarily expressing the view of the Nutrition Society. The Planning Committee is of opinion that the present is an appropriate time for the publication of the memorandum and intends that it should serve as a basis for discussion, from which it is hoped useful suggestions for the training of dietitians will emerge. The memorandum is signed by M. Andross, M. C. Broatch, S. J. Cowell, J. C. Drummond, D. Hollingsworth, D. Johnstone, F. Le Gros Clark, A. Lumby, H. E. Magee, J. R. Marrack, H. Masters, and E. R. Smythe.

1. We consider that the description "dietitian" should henceforth be confined to such persons as are suitably qualified for registration as medical auxiliaries. Persons desiring to qualify must hold a Diploma in Dietetics from a university or training college approved by the British Dietetic Association, or alternatively a degree in dietetics if a degree course in the subject approved by the same body is subsequently established in any of the universities.

DEFINITION

2. The term "dietetics" has been variously defined as "The part of medicine which relates to the regulation of diet" (*New English Dictionary*); as "Medical or Hygienic Art relating to diet or food in health and disease" (Webster); as "The study of food in its relation to human needs, health, etc." (*Universal Dictionary*); and as "The interpretation and application of the scientific principles of nutrition in health and disease" (British Dietetic Association). Of these the last appears to us to be the more precise, and we suggest its expansion to read that dietetics is "The interpretation and application of the scientific principles of nutrition to the human subject in health and disease."

3. The terms "dietetics" and "dietetic treatment" seem to have been well established with their modern connotation by the midde of the nineteenth century; but the word "dietitian," though it occurs about the same period, is commonly of more recent usage. There is some doubt as to the correct spelling of the word. We recommend that the customary spelling be retained; and we define a dietitian as one who is qualified as above.

TRAINING

4. While we consider that the diploma course in dietetics (for particulars see Appendix A) has met the needs of dietitians in the past, the profession has widened its field of activity, and we believe that a uniformly high standard of training should now be established. The most desirable way of reaching this standard would be the opening of a university degree course in dietetics. The course should combine the requisite basic scientific training with all the essential practical work. This would bring the training into line with that of dietitians both in the U.S.A. (see Appendix B) and in the Dominions.

5. While we should always recommend such a degree course as generally to be preferred, we are of opinion that there should be another recognized mode of entry such as the diploma course to the profession intended more particularly for persons whose educational careers were interrupted by the war, or who have decided at a more advanced age than usual to take the dietitian's qualification. This arrangement should, however, be regarded as a temporary one, and it should be reviewed as soon as degree courses are in operation in a sufficient number of universities.

6. The diploma course should be open to all students who hold a university degree or professional qualification similar to those required for the present diploma course (see Appendix A).

7. The diversity of the types of preliminary training at present recognized means that the diploma course has to some extent to be adapted to the varied experience of the students entering the training, especially on the practical side of their work. It is desirable that the student should become familiar from the first with the chemical and physiological concepts implicit in the applied science of dietetics; a preliminary training in nursing and institutional management does not provide sufficient opportunity to acquire this basic knowledge. Nevertheless, we are of opinion that some opportunity should be allowed for qualification to those who, already trained in these subjects, show unusual aptitude for dietetic work.

8. The work of a dietitian responsible to a large hospital or a local authority demands high organizing skill and personal adaptability. Many of those who possess such attributes are still without the full dietetic qualification, but naturally we feel that the lack of such qualification stands in the way of their advancement. We trust that it may be possible for the appropriate authorities to offer some financial assistance to enable such of their catering managers and supervisors as seem capable of reaching the diploma standard to take a training. The profession of dietitian will be much enriched by the recruitment of persons who have successfully controlled large-scale kitchen establishments through the searching years of war.*

9. We would emphasize that all courses in the subject, whether for a diploma or a degree, should include adequate practical experience in catering institutions and hospitals approved by the British Dietetic Association. The profession should not in our view be open to those who have attained a degree only in the theoretical and experimental aspects of the science. All courses in dietetics should closely relate practice to theory. The practical training of dietitians might well include some instruction in public health, and this instruction should embrace such visits to clinics and to the homes of the people as would enable the student to acquire some knowledge of the social background of the future work of a dietitian.

10. Many newly qualified dietitians will lack the experience that enables them to deal with the complex problems of catering and administration, and they will have no more than a theoretical understanding of educational or hospital etiquette. It is necessary, therefore, that they should, after qualifying, have ample opportunity of service under an experienced professional person. This can be effected only gradually as the posts of catering officers and meal organizers or dietetic advisers come to be filled by qualified persons capable of initiating their assistants in the complexities of their professional duties.

APPOINTMENTS

11. It is important that the status and function of dietitian should be clearly defined; the present position is vague and anomalous. At present there is a fairly widespread tendency to regard purely institutional work—e.g., in hospitals, orphanages, schools, etc.—as the only proper sphere for a dietitian. There is nothing in the definition of dietetics to justify this limitation of function. Food is by far the most important environmental factor which determines health, and the dietitian should in our view assume her* due place as a public health

* It is clear to the Committee that the dietitian of the future may be a man or woman, but for the purpose of this memorandum the feminine has been used.

official. In this capacity she can exert the maximum influence on the community.

12. The medical officer of health as the person responsible for the health of the inhabitants within his area should have on his staff an experienced adviser in dietetics, just as he has special officers to advise him on sanitation, food inspection, and various branches of medicine. A post of this nature would be one for a senior dietitian, and would probably rank as among the highest in the profession. The functions of such an officer would be broadly to advise the M.O.H. on all dietetic matters falling within his sphere: diets in hospital, orphanages, and other institutions controlled by the local authority, school meals, advice on diet to mothers in clinics, and educational work. Such educational work might well include co-operation with those responsible for the teaching of nutrition in schools, welfare centres, and advice bureaux. In addition, the dietitian would be expected to play an appropriate part in the conduct of dietary surveys and other nutritional investigations. Depending on the size of the area the officer would have working under her one or more junior dietitians to whom she would delegate her detailed work. It might also be found convenient for the dietitians of the local authority or voluntary hospitals to collaborate in such a way to ensure expert advice on catering and dietetics to any institution requiring it within the area. In this way the needs for such advice of small hospitals and other institutions—e.g., orphanages and boarding schools—could be most conveniently met. Other desirable fields for collaboration are in educational work and nutritional surveys. Such diversity of function would prevent staleness and improve efficiency.

13. Every hospital of about 150 beds or more should have its qualified dietitian responsible only to the medical superintendent or his equivalent in a voluntary hospital. Large hospitals of about five hundred beds or more would require a number of junior dietitians as well as a senior one. (See Ministry of Health Circular 44/45 and *Memorandum on Hospital Diet* issued by King Edward's Hospital Fund for London.)

14. It is almost certain, too, that senior advisory posts will become available in the health and education departments of the Government, and some of the larger food and drug manufacturing firms will probably require dietitians for advice and research.

15. It is obvious that, if only a proportion of these posts were filled by qualified dietitians, many more dietitians will be required. The membership of the British Dietetic Association is at present over three hundred; many of these are registered as medicial auxiliaries. About a quarter of the members are not in practice.

Establishment of the Profession

16. We are aware that the profession should be protected, as far as possible, from the competition of unqualified persons. In the case of other classes of medical auxiliaries, working for the most part under the direction of medical practitioners, this measure of protection is more or less assured. The dietitian may not, however, come into immediate contact with a patient, and for that and other reasons her position is by no means so clearly defined. We stated above the various types of employment we think might be suitably filled by qualified dietitians. It will be necessary to convince the employing bodies that it is in their own interest to seek the services of fully qualified persons.

17. It is desirable, finally, to assure the status of dietitians in local government or hospital employment. The dietitian should be given full responsibility for the work of her department. When employed by a local authority she should be responsible through the appropriate senior officer to the health and education committees. In hospital practice she should be responsible to the secretary or medical superintendent, and should be a member of a catering committee representing those concerned with hospital feeding. In many hospitals the position of the dietitian is not clearly defined in relation to the matron's sphere of control, while she may have little or no contact with the medical staff. If she and her assistant dietitians are to have opportunity of advising and directing in ward feeding, outpatient departments, schools, day nurseries, etc., they must have unquestioned right of access to the chief administrative officer concerned.

Appendix A

Diploma Course (recognized by the British Dietetic Association at present time, June, 1945)

The Diploma Course in Dietetics consists of two parts: a theoretical study of nutrition, followed by a practical course, which must be closely allied to the theoretical work and taken in a hospital recognized by the British Dietetic Association. There are at present four institutions recognized by the British Dietetic Association at which students may be awarded a diploma in dietetics. The length of the course varies from 12 months to 18 months; this time includes the theoretical training and the 6 months' practical work. Students are advised to take a further 3 months' training in large-scale catering in the general kitchen of a hospital or in a canteen.

The Diploma Course is open to students who have one of the following qualifications: (1) University Degree in one of the following: (*a*) household and social science; (*b*) domestic science; (*c*) pure science, including physiology and chemistry and followed by at least three months' concentrated cookery training in an institution approved by the British Dietetic Association. (2) State Registration in Nursing. (Extra training in physiology, chemistry, and cookery may be necessary.) (3) Teachers' Diploma in Domestic Science. (Extra training in physiology and chemistry may be necessary.) (4) Institutional Management Diploma after at least two years' training at a recognized college of domestic science. Such students must hold the School Leaving Certificate or equivalent qualification. (Extra training in physiology and chemistry may be necessary.)

Appendix B

Requirements for Membership of the American Dietetic Association

A. Academic

1. Either a bachelor's degree from an accredited college or university with the following distribution of courses and hours until Aug. 31, 1944 (academic requirements were raised after Sept. 1, 1944):

Subject	Approved Course Graduates	Experienced Applicants	
		Foods and Nutrition	Institution Management
	(Minimum Semester Hours)		
Chemistry (including inorganic, organic, and physiological. Food chemistry may replace physiological for institution management majors)	12	12	12
Biology (including human physiology and bacteriology)	6	6	6
Social sciences (selected from at least two of the following: psychology; sociology, economics)	9	6	6
Education	3	0	0
Food preparation	6	6	6
Nutrition (including an advanced course)	6	6	3
Institution economics	6	0	6

2. Or a bachelor's degree from an accredited college or university followed by courses to complete the above outline. Five semester credits in nutrition or allied fields must have been secured within seven years of the date of application, except in cases where experience is of a type acceptable to the membership committee as a substitute.

B. Experience

The following experience is required in addition to the above college work: Either satisfactory completion of a course for student dietitians approved by the association or two years of successful experience in a position involving responsibility which seems to the membership committee to be the equivalent of such a course. The committee will consider the following types of experience: (*a*) Hospital—this must have included main kitchen supervision, diet therapy, and teaching. (*b*) College teaching in the fields of foods and nutrition or institution management. (*c*) Management of school lunch-room, residence hall, etc. (*d*) Nutrition work with a social service or public health agency. (*e*) Commercial work of a type satisfactory to the membership committee.

At least one year of this experience shall have been within seven years of the date of application.

BRITISH SURGEONS' VISIT TO PARIS

Some months ago the President of the Royal College of Surgeons of England received an official invitation from Prof. Bazy, of the Académie de Chirurgie, asking him and some of his colleagues to attend their first post-war meeting in October, 1945. Accordingly three members of the Council of the Royal College of Surgeons and three Fellows of the Association of Surgeons of Great Britain and Ireland went to Paris on Oct. 7. After years of oppressive occupation the first official meeting of a professional body with the distinguished traditions of the Académie Française de Chirurgie, and under the presidency of Prof. Monchet, could not fail to be impressive. More impressive still was the warmth and friendliness of our welcome, which showed beyond any doubt that this was a genuine expression of feeling coming straight from the heart of our colleagues, and no mere official gesture.

Mr. Max Page (Vice-President of the Royal College of Surgeons) brought official greetings, and presented the president of the Academy with a book of photographs of the Royal College of Surgeons soon after it had been bombed, and he was complimented by an invitation to take the chair at the first scientific session. Later we were given a reception by Prof. Monchet, and were entertained to dinner by Prof. Bazy. On the second day a reception was given by the British Ambassador, and a dinner by Prof. Hartman, the doyen of French and perhaps of European surgeons. A group of Belgian surgeons also gave us an unforgettable luncheon party, and their friendliness well matched the rest of our reception. The significance of this welcome must be seen against the background of Paris as it is to-day. Outwardly, in the warm autumn sunshine, no fantasy could excel its beauty, but daily life for the Parisians is extremely difficult, and we who have our needs provided, albeit in a dull pedestrian way, have little idea of their daily hardships.

We were able to see enough to prove that French surgery and French thought have not been either stagnant or sterile, and it is to be hoped that soon facilities will be available for close co-operation and more intimate personal intercourse. It is for professional bodies and individuals to make history a creative and fruitful process. At the moment this cannot be done without official help. Great Britain is committed to the role of a Continental Power, and for us France is the gateway to Europe. Professional contacts cannot determine policy, but they can make policy easy; it is therefore not unsuitable that in a professional journal we should ask for more facilities for easy and intimate contact with our colleagues in Western Europe.

H. W. S. W.

TUBERCULOSIS IN WAR AND PEACE

Prof. CHARLES CAMERON, in his inaugural lecture as professor of tuberculosis in the University of Edinburgh, began by urging that the public should not be lulled into an illusion of security by falling death figures. Tuberculosis either killed quickly or, having lost the first round, sparred warily with its victim, and the next few years would show how the struggle would go for those who had lately swelled the notification lists. Great Britain had inherited a problem aggravated by years of war.

Scottish Figures

Quoting the main figures for Scotland Prof. Cameron said that deaths from tuberculosis rose from 3,431 in 1938 to 4,175 in 1941; they fell to 3,995 in 1942 and to 3,959 in 1943. On analysis of the age periods of those deaths, the main rise was found to be in children under 5 years of age and in young adults from 15 to 25. Turning to notification, progressive increases were found throughout the same years, but they were almost entirely in pulmonary tuberculosis, the 1943 figures for which were 54% above the 1938 level. The peak of the deaths was reached in 1941, but the peak of notifications had yet to be reached, and tuberculosis was still increasing in the community. Another point brought out by the figures for Scotland was that deaths in 1943 from non-pulmonary forms of the disease (which virtually meant disseminated tuberculosis) were for young women 42%, and for young men 34%, above the pre-war level. Prof. Cameron shared the belief that many or most of those young people were succumbing to late primary infections, but in the absence of exact knowledge of the spread of infection in age groups and areas such statements could not be substantiated.

Detection and Responsibility

Speaking of the schemes of mass miniature radiography, Prof. Cameron said that it had been estimated that in the United Kingdom there were probably 15,000 young adults suffering from unsuspected lung tuberculosis of an early symptomless type. To discover them the whole young adult population must be examined, and the examination must be repeated at intervals. Detection of these cases implied big social responsibilities, which local authorities and Government alike must be prepared to accept. Whether the care of the tuberculous should be put on a national basis was a point needing careful consideration. The disease during the past thirty years had passed into the hands of local authorities and their whole-time employees. Most patients had no alternative to local authority treatment, and the authorities must face the question whether they were fulfilling their responsibilities to those people.

Lastly, Prof. Cameron declared that the milk supply of the future must come from sources above suspicion or the milk must be treated by efficiently controlled pasteurization before it reached the consumer. There ought to be no compromise with an infection which was readily preventable.

RECOGNITION OF CIVILIAN BRAVERY

The *London Gazette* has announced the appointment as M.B.E. (Civil Division) of Mrs. FLORA LIVINGSTONE MACDONALD, M.B., Ch.B., of Aros, Mull, and the award of the B.E.M. (Civil Division) to Messrs. A. CATTANACH, D. ROSS, and W. WALKER. The citation reads as follows:

An aircraft crashed near the summit of Ben Talaidh, Mull, in very bad flying weather. The aircraft struck the mountain obliquely, at about 2,300 feet, slid downwards some 300 feet, and came to rest on snow in a highly precarious position. Any disturbance of its balance would have caused it to crash into a rocky gorge. There were eight occupants of the machine. One was thrown out at the high level and killed, another was crushed under the aircraft, a third was injured dangerously and died during the rescue work. One injured passenger managed to get down to a cottage to give particulars. The remaining four occupants were all seriously injured and unable to help themselves. Distress signals were sent up and rescue parties were organized. Cattanach was the leader of one party. Snow and ice lay everywhere, with deep drifts. The river was in flood and the banks treacherous. Dr. Macdonald's leg was cut in the ascent, and at one time she was waist deep in icy water and had to be pulled out. When they reached the aircraft she gave first aid to the injured, and the others searched for one of the occupants of the aircraft who was missing. Another search party with stretchers set out, but having no knowledge of the whereabouts of the aircraft they returned. Cattanach and Walker, who had seen their lights, went down the hill to lead the party to the scene of the crash. The stretcher party were now becoming exhausted, and Cattanach and Walker, who were leading them, did most of the heavy work with the stretchers. It had become known that one body lay where the crash first occurred. Ross had tried this climb, up a very steep and dangerous face, but failed in the darkness. A further effort was made in daylight by Walker and Ross, who climbed up successfully, reached the body, and brought it down. By the determination of the rescue parties four lives were saved. In particular Cattanach, Ross, Walker, and Dr. Macdonald displayed courage and endurance of the highest order.

REGINALD NORMAN MACDONALD, L.R.C.P.&S.Ed., of Aros, Mull, has been commended for brave conduct when an aircraft crashed.

RÖNTGEN COMMEMORATION IN LONDON

To commemorate the 50th anniversary of the discovery of *x* rays by Wilhelm Conrad Röntgen on Nov. 8, 1895, a series of meetings will be held next week in London at the Royal Society, the Royal Society of Medicine, the Royal Institution, and the Institution of Electrical Engineers. The programme has been planned jointly by a number of societies interested in the medical, scientific, and industrial aspects of *x* rays. Attendance at the inaugural meeting in the rooms of the Royal Society on the morning of Thursday, Nov. 8, will be by invitation only. At the Royal Society of Medicine on Nov. 8 at 4.45 p.m., with Lord Horder in the chair, four short addresses will be given by Dr. R. E. Roberts, Dr. James Brailsford, Prof. F. L. Hopwood, and Mr. Cuthbert Andrews. All the participating societies will hold a joint meeting at the Phoenix Theatre, Charing Cross Road, at 3.30 p.m. on Nov. 9, with Sir Henry Dale, P.R.S., in the chair, when Sir Lawrence Bragg, F.R.S., will give an address on the scientific consequences of Röntgen's discovery of *x* rays. On the morning of the same day Drs. A. E. Barclay and N. S. Finzi will read papers at a medical meeting at the R.S.M., and on Nov. 10 at 2 p.m. at the Institution of Electrical Engineers, with Dr. Russell J. Reynolds in the chair, Mr. H. T. Ferrier will give an address on postgraduate education in medical radiography. A small exhibition of historical items will be held at the British Institute of Radiology, 32, Welbeck Street, W., on Nov. 8, 9, and 10, from 10 a.m. to 6 p.m. Other meetings will be devoted to the applications of *x* rays to physics and chemistry, and to industrial radiology and *x*-ray analysis and equipment.

Reports of Societies

PSYCHIATRIC LESSONS FROM ACTIVE SERVICE

In his presidential address to the Section of Psychiatry of the Royal Society of Medicine on Oct. 9, Dr. G. W. B. JAMES gave a review of lessons learned from military service and suggested ways in which those lessons might influence the future of psychiatry. He counted himself fortunate to be a member of a generation which had survived two major wars. It had meant that nearly ten years of his professional life had been spent in the Army, almost seven of them on active service over-seas. He made grateful acknowledgment of the debt he owed in his own development to the years spent in the Army Medical Service.

The Psychiatric Casualty

After dealing with some aspects of group formation and the knowledge to be derived from a close study of groups of men, Dr. James remarked that in making contact with doctors from all over the Empire in the Middle East Force he had found them, with few exceptions, bewildered by the psychiatric casualty and unable at first to deal with it on active service. He showed a table giving the psychiatric casualties expressed as incidence per 1,000 of the Middle East Force. For all troops they numbered 24.0 in 1941, and 21.2 in 1942, whereas the corresponding figures for battle casualties were 36.7 and 31.1 respectively, for malaria 19.5 and 29.1, and for dysentery 28.9 and 33.3.

"This considerable section of casualties was often looked upon with distaste. It would appear as if the medical training of the Empire's doctors had resulted in an almost obsessional avoidance of the life situation of their patients. Immediate simple therapy in the field tended to be replaced by a frantic testing for allergies, searching for septic foci, an earnest use of *x* rays to discover the sources of hidden troubles; as a last resort search was made for a nomenclature decently to veil the emotions and other mysteries which might get the casualty into the hands of that less reputable practitioner—the psychiatrist. The practical result of this odd dislike of psychiatry on the part of so many doctors is too often a failure to recognize and handle adequately the recent psychiatric breakdown, whether in war or peace."

The rift between general medicine and psychiatry must not be allowed to widen. Must psychiatry remain a specialty apart? He believed that it was for general medicine to absorb and integrate within itself the principles psychiatry had to teach, while psychiatrists in turn must show their ability and eagerness to absorb the lessons of modern medical advances. The rift might be partly healed by the physical methods of treatment which had been introduced into psychiatry during the last thirty years—malaria in paresis, the insulin therapies, electric convulsive therapy, continuous narcosis, prefrontal leucotomy, and the narco-analysis which had proved so useful in rapid abreaction techniques. These were such effective weapons for the early attack on certain psychiatric conditions that the methods should be made widely familiar to a greater circle of students and doctors. Again, in order to secure facilities for a more extensive psychiatric service the future general hospital must include beds for psychiatry. Properly chosen psychiatric patients were no more trouble than the average medical case, and often gave to therapists an encouragement which could not be exceeded in medical or surgical wards.

Restatement of Terms

Some of the terms in psychiatry were used without sufficient discrimination. "Schizophrenia" was one example, and others were "anxiety neurosis" and "anxiety state," which seemed to be supplanting the old "neurasthenia" as a convenient portmanteau term for everything from alcoholism to senility. During seventeen months in the Middle East 530 cases of psychosis needed evacuation, and 80% of these left the command as cases of schizophrenia, whereas the admission rate for schizophrenia to civil mental hospitals was roughly 16 to 19% of all cases—a figure which included women as well as men. Why did schizophrenia figure so largely in military psychiatry? He was convinced that it was not always fair to the soldier to assume that the stresses of war were never the direct cause of psychotic breakdown. He had seen instances of classical schizophrenic breakdown resulting apparently from battle stress of one kind or another, occurring among men of good type, with good family and personal records. Many men arrived from oversea theatres with the label "schizophrenia"; they were symptom-free, but had a dossier which justified the diagnosis. Some had been suffering from infective conditions, others might have been unusual hysterics, but some might fairly be said to have suffered from an acute schizophrenic episode, the direct result of war service.

Another table shown by Dr. James gave the percentage incidence by units of a sample of 3,724 psychiatric casualties among British troops in the Middle East Force during a period in 1942–3. The casualties in the infantry were 22% of the total of psychiatric casualties, those in the artillery 20%, but those in the service units (the R.A.S.C., R.A.M.C., R.E.M.E., etc.) were 32%, seeming to suggest that the heaviest casualties were experienced in these services and that a smaller incidence fell on the fighting man.

Effects of Battle

Dr. James concluded his address with a discussion of the effects of battle. It was true in general to say that no soldier was quite the same after battle experience. This was the psychiatrist's first problem—the acute battle crisis in which even the trained soldier might regress to the levels of childhood. The second problem of battle was that relating to long campaigns. In his experience it was not possible for soldiers to make an infinite number of calls upon resolution and endurance. The problem of exhaustion was one of the most urgent psychiatric emergencies of war. Battle conditions, nevertheless, were relatively minor factors in the aetiology of psychiatric casualties in the Middle East. The greater number resulted from lack of adequate selection or from the harassing anxieties of separation, domestic and marital worries, climatic conditions, uncertainties, tropical illness, and impropr placement and employment.

The lesson to be learned was the need for a carefully planned organization for assessment, rapid treatment, convalescence, and rehabilitation. Understanding approach and immediate sedation was the principal need of the front line. Psychiatric first aid was as urgent as surgical first aid and ought not to require specialist help. The setting up of a new convalescent depot with 200 beds allotted to a psychiatric specialist during the heavy desert fighting of 1942 showed that about 90% of the men breaking in battle could be restored to a good standard of stability, though only a fairly constant 30% returned satisfactorily to combatant duties.

RESPONSIBILITY FOR ACCIDENTS IN RADIOLOGICAL DEPARTMENTS

In his address from the chair of the Section of Radiology of the Royal Society of Medicine on Oct. 19 Dr. W. M. LEVITT, the incoming president, who is forsaking medical practice for the legal profession, discussed the responsibility for accidents in radiological departments.

The incidence of accidents in *x*-ray work in this country, he said, was low; nevertheless, the total number of cases was not small, and he had himself seen in consultation or for expert opinion a number of injuries due to electrical accidents and *x*-ray burns in patients and staff. A small proportion resulted from over-exposure in radiodiagnostic work, but by far the larger number were sustained as a result of *x*-ray or radium treatment. Inevitably in the future large departments would be established in institutions where there was no previous knowledge of radiotherapy, and these would be under the control of bodies with no idea of the special problems they presented.

Dr. Levitt first considered the respective responsibilities of hospital authorities, radiologists, and radiographers. Before 1942 the law was based on the well-known decision in Hillier *v.* St. Bartholomew's Hospital (1909) that the contract of the governors of a public hospital with a patient undergoing surgical operation or examination was only to supply a competent hospital staff and nurses, with proper apparatus and appliances, and unless it was shown that they had failed in this duty they were not responsible for injury caused to the patient by negligence of the hospital staff. There was one qualification to this, that the hospital was responsible for the negligence of the staff in minis-

terial matters—that is, matters outside their professional duties. For example, if a nurse scalded a patient by spilling a cup of tea over him, the occasion of the act being outside her nursing duties, the hospital might be judged liable, but if she scalded him by the negligent application of a hot-water bottle after an operation presumably no responsibility would lie with the hospital.

The case of Gold *v.* Essex County Council (1942), however, had altered the situation. In this case a competent and qualified radiographer in applying Grenz rays according to a prescription had caused injury by failing to screen the patient's face with the proper screening material which was available. The Court of Appeal in this case laid down certain important principles which now governed the law in the matter. The legal principles were that one who employed a servant was liable to another person if the servant within the scope of his employment did an act so negligently as to injure that person, and that principle applied even though the work was of a skilled and technical character of which the employer himself was ignorant. The liability of the master for the negligent act of the servant would exist although at the time the servant was by direction of the master under the control of a third party. One of the Lord Justices in this case distinguished between a "contract of service" and a "contract for services"; under the first the employee worked under instructions either from the employer or from some person appointed by him, and under the second he was not subject to such control in carrying out his service. It was not unknown in public authority hospitals for the medical superintendent to exercise overriding powers—as, for example, on the ground of economy to cancel a prescription given by a subordinate officer. A medical superintendent might possibly limit the number or extent of the radiodiagnostic investigations in a given case. Such powers necessarily made the medical officer's contract "a contract of service," and not a "contract for services," and threw the burden of responsibility for his acts upon the hospital.

Common-law Duties of Hospital

What were the duties which the law imposed on hospital authorities for the safety of patients and staff? Every conceivable accident that could occur to a member of the staff in the radiological department now came within the Workmen's Compensation Act, even though the employee had been careless of his own safety. In considering the duties imposed on a hospital for the safety of the radiological department—which department differed from most others in that it depended for its operation on potentially dangerous machinery—a House of Lords decision in 1938 laid it down that the duties of the employer were threefold: to provide a competent staff, to provide proper and safe plant and appliances, and to provide a proper system of conducting the work and efficient supervision of the work. The House of Lords also held that these responsibilities could not be delegated. The special meaning of "delegation" made it appear that even though the employer had taken every possible care to ensure the competence of any person to whom he delegated responsibilities, that would be no defence if the apparatus was inadequate or the system of working defective.

It was in considering the radiographer, and especially the radiotherapy technician, that difficulty began. Was the qualified radiographer necessarily qualified to act as a radiotherapy technician? The possession of a radiographer's qualification was no evidence at all of competence as a radiotherapy technician. Many important hospitals employed carefully selected nurses as radiotherapy technicians, giving them the technical training required. Were these hospitals to be in a less favourable position than those which employed a qualified radiographer? Yet many hospitals felt that they must protect themselves by employing only technically qualified radiographers, with the result that people who had acquired radiotherapy technique and experience were lost to the service. It was the radiologist alone who was capable of judging the competence of a radiographer or a radiotherapy technician.

It was the duty of the hospital also to provide a safe system of working. A safe system had two main constituents: (1) adequate protection against dangers and regular inspection and checking of the department; and (2) the framing of such rules as were necessary to ensure minimum exposure. A radiotherapy department required the regular and frequent attendance of a physicist. The common-law duties of the hospital, therefore, were to provide an adequate staff appointed with due care, safe and efficient apparatus, and a safe system of working with due supervision, which, in the case of a radiotherapy department, meant the employment of the services of a physicist, and these duties could not be delegated; they were the strict liability of the hospital throughout.

The Manufacturer's Share

Dr. Levitt finally mentioned the liability of the manufacturer and repairer of apparatus. The law was that when a manufacturer sold his product in such a manner as to indicate that it was intended to reach the consumer in the form in which it had left him, with no reasonable possibility of intermediate examination, the manufacturer was responsible for its reasonable safety on arriving at its destination. In the radiological field the supplier of *x*-ray apparatus which was defective would be liable. Many years ago, Dr. Levitt said, he had had delivered to him a deep-therapy machine from a well-known manufacturer. All measurements were carried out by the manufacturer and it was passed as satisfactory. By chance, just before he used it on a patient, he decided to make some measurements himself, and a skiagram showed that the shadow at the periphery was seven times as dense as at the centre. Further examination and calculation proved that the filter supplied was nearly one centimetre less in diameter than the beam.

SYNERGIC ACTION OF PENICILLIN AND SULPHATHIAZOLE

At a meeting of the Section of Pathology of the Royal Academy of Medicine in Ireland Dr. J. W. BIGGER read a paper on the synergic action of penicillin and sulphathiazole on *Bact. typhosum*. By using broth from which antagonizing substances had been removed by the method of Harper and Cawson he had found that sulphathiazole in a concentration of 10 mg. per 100 c.cm. had a considerable inhibitory effect upon the growth of small inocula of typhoid bacilli. With large inocula it was almost without effect. Penicillin in a concentration of 9 units per c.cm. and less had some inhibitory effect, even on large inocula. The combination of sulphathiazole and penicillin was not only inhibitory but bactericidal: 4 units per c.cm. of penicillin and 10 mg. per 100 c.cm. of sulphathiazole sterilized broth containing 70,000 typhoid bacilli per c.cm.; penicillin, 1 unit per c.cm., and sulphathiazole, 10 mg. per 100 c.cm., sterilized broth containing 7,000 typhoid bacilli per c.cm. He outlined a scheme for trial in clinical cases.

In the course of a Chadwick Lecture entitled "Health Education, its Problems and Methods," given on Oct. 30 at the Livingstone Hall, Westminster, Dr. Walter P. Kennedy said that health education to-day had developed from hygiene and preventive medicine by emphasizing the promotion of health rather than the prevention of disease. This positive point of view was best understood by applying the methods of dynamic logic or by a statistical treatment of the components of health. By attention to the factors which made up health, improvement could be obtained even in those who would say they were healthy. Once the true meaning of health had been grasped it must be regarded from the holistic point of view. An evaluating survey of the methods of health propaganda and teaching had still to be made. Dr. Kennedy stressed three desirable developments: provision of more "workshops of health"—i.e., swimming baths, gymnasia, and the like, especially in small centres of population; the training of more teachers in biological sciences; and the greater co-ordination of the Churches with the pursuit of national health aims. His general thesis was that no health education could be complete unless it included in its ambit the physical, mental, and moral activities of man.

The rapid strides made since the end of the European war in adapting the plastic "perspex" to peacetime uses were seen at an exhibition in Birmingham recently arranged for the purpose by I.C.I. Already a wide range of commercial articles are being produced, but the only medical items shown among the main exhibits were instruments demonstrating the "piping of light through curved perspex," which could be sterilized in boiling water. The use of "perspex" in orthopaedics has been described more than once in these columns.

Correspondence

Galvanic Stimulation of Denervated Muscle

SIR,—The communications of Fl. Lieut. E. C. S. Jackson and Prof. H. J. Seddon and of Dr. R. E. M. Bowden (Oct. 13, pp. 485 and 487) have so much in common that they may be discussed together. In each of these papers evidence is adduced to show that the galvanic stimulation of denervated muscle tends to limit its atrophy, and this is in accordance with expectation. Upon this conclusion there is based the important assumption that galvanic stimulation is of high clinical value in promoting a good recovery; this assumption, however, is unsupported by direct evidence, either clinical or experimental. For example, in the cases of ulnar paralysis (Jackson and Seddon) there is nothing to show that the functional results were better in the galvanically treated cases than in the cases not so treated. Similarly, in the experimental rabbits (Bowden) there is no evidence that recovery of the galvanically treated limbs took place more rapidly and completely than in those not so treated.

If galvanic stimulation possessed any definite clinical value it might certainly be expected that this would have been noticed by experienced orthopaedic surgeons; yet there is no decided body of opinion on the subject. The general opinion appears to be that the requisites for success in nerve suture are good apposition of the axons followed by judicious after-treatment, the value of electrical treatment being left in doubt. It is certain that good results may be obtained in the absence of galvanic stimulation, either before or after operation.

It is a question that requires careful consideration whether galvanic stimulation may sometimes serve to maintain the muscles at the cost of the regeneration of the nerve, and may thus do more harm than good. This possibility is raised by the observation that the interruption of galvanic treatment has occasionally been followed by an obvious improvement in the rate of recovery. As a theoretical consideration, it is possible that the katabolic activity induced by continual galvanic stimulation may impair the anabolic activity necessary for the slow and difficult regeneration of the nerve. At a certain stage physiological rest may be the best adjunct to recovery, being gradually replaced by voluntary movements as regeneration occurs. To make a somewhat wide comparison, the frequent dressing of surgical wounds was formerly thought to be advantageous, but it is now known that they often do better if they are left alone.

The present aggregation of nerve lesions may afford the opportunity of comparing the functional results in groups of cases treated with and without galvanic stimulation. Direct clinical evidence of this kind would be a more reliable guide to practice than deductions from histological appearances.—I am, etc.,

Sheffield. R. G. ABERCROMBIE.

Morphine as Prophylactic against Ileus

SIR,—The suggestion made by Mr. J. T. Chesterman and Dr. W. J. Sheehan (Oct. 20, p. 528) that morphine can be used as a prophylactic against paralytic ileus is of great interest to the pharmacologist. When a dog is given morphine preparatory to a general anaesthetic it is usual for the dog to pass loose faeces within about 20 minutes of the injection. This I have always supposed to be due to stimulation of the vagus centre in the medulla, for there is a slowing of the pulse rate and often the dog vomits. Simultaneous stimulation of the vagal and vomiting centres is, of course, a common phenomenon. Presumably the beneficial effect of morphine on paralytic ileus is due to this early action, which leads to an increased discharge of motor impulses to the intestines.

The later effects of morphine on intestinal movements are, however, different. Magnus showed in 1908 that morphine delays the passage of a bismuth meal through the intestinal canal of a dog. Whereas in a control observation the meal was seen to enter the colon three hours after it was taken, after morphine the meal did not enter before 12 hours had elapsed. The dose given was very large—0.1 grain per kg., equivalent to 6 grains for a man. I imagine, however, that Mr. Chesterman and Dr. Sheehan would agree that in some subjects at least the ordinary therapeutic dose of morphine has a constipating effect. (See, for example, A. J. Clark's *Applied Pharmacology*, seventh edition, p. 342: "All observers agree that these drugs [morphine and opium] cause a great delay in the passage of the gut contents through the alimentary canal, and there is no doubt that this delay is chiefly caused by contraction of the pyloric and ileo-colic sphincter. Small quantities of morphine frequently cause increase in the peristaltic activity of the gut, and the observers who have studied its action most fully consider that great individual variation in reaction occurs.")

In view of these two opposed actions of morphine, what conclusion are we to draw from the figures given by Mr. Chesterman and Dr. Sheehan? I would like to see a study of the effect of 1/4 grain morphine given 6-hourly for 48 hours on the passage of a bismuth meal in 20 normal subjects. In the absence of the information which this study would supply, my personal conclusion is that Mr. Chesterman and Dr. Sheehan have demonstrated only that their proposed prophylaxis is not dangerous: it does not conduce to ileus in patients on whom a Caesarean section has been performed. The actual fall in the percentage of cases of ileus in the morphine period is of little significance in view of the fact that the control cases were not "alternate cases," but were cases in earlier years when many points in the handling of the patient must have been different.

The serious side of this paper is that some may conclude that morphine is a prophylactic against ileus after operations on the intestine itself. If we take into consideration all that is known of the action of morphine on the intestine this conclusion is not permissible; morphine is a drug likely to increase the incidence of ileus after such operations. What is fortunate is that there is a well-known drug which is there for everyone to use having none of the dangers of morphine. That drug is physostigmine. Its action is very simple. The movements of the alimentary canal are maintained by the steady synthesis of acetylcholine. This is formed in the gut wall, it exerts its action, and it is then rapidly broken down. Physostigmine delays the rate of breakdown of acetylcholine and so increases intestinal movements in the most natural way.—I am, etc.,

Oxford. J. H. BURN.

Penicillin and Synthetic Rubber

SIR,—Letters have recently appeared relating to the inactivation of penicillin by synthetic rubber tubing. Some time ago the Medical Research Council, jointly with the Ministry of Supply, called a conference to consider the possible uses of synthetic rubber for medical purposes. The members of the conference hope to be able to designate a type of rubber which may be relied upon not to destroy penicillin. It would be helpful if any others who have experienced similar difficulties with inactivation of penicillin would inform me, indicating at the same time the source and history of the tubing used if these can possibly be ascertained.—I am, etc.,

P. G. H. GELL,
Secretary, M.R.C. and Ministry of Supply Synthetic Rubber Conference.

National Institute for Medical Research, Hampstead, N.W.3.

Ludwig's Angina

SIR,—In view of recent correspondence in your columns by Mr. Hamilton Bailey and Mr. J. H. West *et al.* on the subject of anaesthesia for operation on cases of Ludwig's angina, I feel it is important that case notes on this subject should be given publicity, because of the possibility of sudden regrettable accidents which may occur unless the anaesthetist concerned is reminded of the dangers present in this type of case.

Supporting Mr. Hamilton Bailey's remarks (Sept. 29, p. 440) I would like to add my personal experience of three such cases which occurred during the later weeks of a nine-months period during which I was acting as temporary resident anaesthetist, in addition to my other duties, at a South London hospital recently.

Case 1.—This was in a child of 6 years with Ludwig's angina of undetermined origin. Anaesthesia was induced with gas-and-

oxygen, and as soon as a trace of ether was introduced spasm of the glottis developed. Intubation under direct vision was immediately attempted, but was unsuccessful owing to severe glottic spasm; only the fact that an emergency tracheotomy set was readily available and promptly used by an experienced surgeon prevented this child from dying. As it was, several ounces of pus under tension was evacuated after further anaesthesia per the tracheotomy tube. Convalescence was rapid and uneventful. The tracheotomy tube was removed after 48 hours.

Case 2.—This was of post-operative suppurative parotitis in the edentulous woman of 54 years of age, which was at first treated conservatively. As resolution was obviously not taking place it was suggested that I should give a "shot of pentothal" while an incision was made. In view of my experience in Case 1 I decided that a careful induction with gas, oxygen, and trilene would be wiser, a tracheotomy set being handy and the larynx cocainized. Induction was smooth, and on laryngoscopy oedema of the corresponding arytenoid was seen to be present. A tracheotomy tube was passed and operation completed. Several pockets of pus were drained. Local analgesia would have been difficult and imperfect in this case.

Case 3.—This was a case of Ludwig's angina in a man of 37 following evacuation of an infected dental cyst. Post-operative penicillin therapy had resulted in the temperature falling rapidly from 103° F. to normal in three days, but at this time dysphagia was complained of. I recommended local analgesia, and under this a large quantity of sub-mylohoid pus was evacuated per a midline incision. Recovery was uneventful.

I publish these case records largely for the benefit of the less experienced anaesthetist, in the hope that they may avert a tragedy, as my first case nearly was, and in passing to stress the obvious fact, not always remembered, that penicillin, and indeed chemotherapy, will not cause resolution of an established abscess, even though the primary focus may have been promptly dealt with; also to point out (Case 2) that suppurative parotitis may, and did in the case quoted, give rise to dangerous oedema in the region of the glottis. Fortunately dysphagia usually precedes dyspnoea in this type of case. The time interval between unrelieved glottic spasm and cardiac failure in the elderly subject and in the very young, especially when toxaemia is present, allows only a very short period for emergency intubation or, failing this, tracheotomy.—I am, etc.,

Royal National Throat, Nose and Ear Hospital, London. K. R. OGILVIE.

Blind Intubation

SIR,—While seconding Dr. John Insley's remarks on blind intubation by way of the nose (Oct. 13, p. 512) I would also like to make a plea for blind peroral intubation, the simplicity, efficiency, and economy of which I can vouch for as a result of long experience.

When the surgical advance of rhino-laryngology demanded intratracheal intubation anaesthesia I used, *faute de mieux*, Kuhn's peroral intubation apparatus. This consists of a flexible metal tube the distal end of which is suitably fenestrated, while the proximal or outer end has a locking device for attaching it to a tube leading to the source of anaesthesia. It is introduced by means of a curved metal obturator attached to a handle. This obturator (which could be readily improvised) has a total length of 14½ in., of which 4 in. are handle. The rectangular curve starts about 7 in. from the distal end of the handle. Finding the metal tubes were clumsy and at times traumatic I substituted rubber tubes, and have since used this method with complete satisfaction. The tracheal end of the tube (the internal diameter of which varies, according to age and sex, from 5 to 10 mm.) is cut obliquely and dipped in sterile liquid paraffin, as also is the curved end of the obturator. The tube when mounted should extend at least one inch beyond the lower end of the latter. After insertion and withdrawal of the obturator the outer end of the rubber tube is connected to the tube from the gas apparatus (or, eventually, to a tube and funnel) by means of a small, curved or L-shaped metal connexion. Before introduction the larynx is sprayed with 10% cocaine solution, after which a pledget of gauze soaked in the solution is applied in the laryngeal vestibule by means of Mackenzie's laryngeal forceps and held until the resultant cough is followed by an inspiration. This can be more pleasantly achieved after general anaesthesia has been induced sufficiently to allow of wide separation of the jaws.

The main difficulties in introduction are obstruction by the epiglottis and the readiness with which the free end of the tube tends to find and enter the oesophageal ostium. To overcome these the index finger of the left hand is introduced to the hypopharynx from the angle of the widely gagged mouth. The *tactus eruditus* of this finger must be such as to allow of quick and accurate location of the epiglottis and of the apices of the arytenoid cartilages, immediately over which latter it retains its position, plantar surface forwards. Upon introduction of the obturator and tube the free end of the latter is made to occupy the potential space between the finger and the dorsal surface of the epiglottis, its oblique tip being directed into the rima glottidis by the finger, which, incidentally, is preventing the tube from entering the oesophagus. Some difficulty may be experienced in a deep larynx or from an unduly large or flaccid epiglottis, but a little patience and experience can overcome this. No force is employed. The actual passage of the rima glottidis is made during an inspiration, and its accomplishment is denoted by the sound of air going through the tube (which should be listened for) and by a short cough.

This method, while it takes time in the telling, can be carried out in a matter of seconds, and I feel that the experienced anaesthetist should be able to do it.—I am, etc.,

Cork. J. B. HORGAN.

Anaesthetic Risks

SIR,—It is fortunate that Dr. E. Falkner Hill (Oct. 13, p. 511) has answered Dr. John Elam's unbalanced judgment on spinal anaesthesia. Notwithstanding certain disadvantages attached to spinal anaesthesia, there is a large body of experienced surgeons who will agree that it plays a very important part in surgery, and most certainly in the upper abdomen. Figures, when sanely considered, are a help.

The following figures show the death rate in this hospital after partial gastrectomy for duodenal ulcers, excluding all cases of severe haematemesis or melaena at the time of operation:

Period	No. of Cases	Anaesthesia	Deaths	Mortality
1931–5	99	General	9	9% approx.
1936–9	125	Spinal	4	3·2% ,,

It was in 1936 that the routine for these cases became a spinal anaesthetic.

I should not like to give the impression that this improvement in mortality is solely due to a change in the method of anaesthesia, but it is quite likely that it was a very important factor in the improvement. Just to make certain that 1936–9 figures were not accidental, the figures for gastrectomies for duodenal and gastric ulcers (again excluding active bleeding ulcers) for 1942–5 (June) are given:

Period	No. of Cases	Anaesthesia	Deaths	Mortality
1942–5 (June)	205	Spinal	3	1·5% approx.

Spinal was used as the principal anaesthetic. Two surgeons supplemented this with pentothal and gas-and-oxygen with a little ether or trilene to maintain sleep. Another surgeon used spinal anaesthesia only, with local infiltration with novocain along the upper end of the lesser curve during 1944–5. This series included two cases with open pulmonary tuberculosis.

The surgeons at this hospital, present and past, do not suffer from any delusions about this mortality rate. They consider that 1.5% mortality is fortuitous, even though it is in a series of over 200 cases. They feel that a mortality rate of 3 to 4% is a more accurate figure over a larger series of cases. There is one point about which neither surgeons nor anaesthetists have any doubt whatever. It is that in their hands it has made partial gastrectomy safer for the patient and less anxious for the surgeon.

In my opinion Dr. Elam would be doing a great disservice to surgery if he succeeded in dissuading surgeons and anaesthetists from using spinal anaesthesia. It goes without saying that the greatest care is needed in its administration.—I am, etc.,

Miller General Hospital, S.E.10. F. H. MASINA.

Longevity

SIR,—Most statisticians would agree with the conclusions reached by Dr. A. Forster in his interesting letter (Oct. 20, p. 545). We have not at present enough accurate data of survival to reach statistical results much better than guesses. There is a small point, of no practical importance but biologically interesting—namely, Is it *impossible* or only *very improbable* that a human being should live to the age of Methuselah?

Some years ago Dr. J. O. Irwin and I made a study of the bio-statistics of senility (*Human Biology*, 1939, **11**, 1–23). The most exact data we had related to 240 female and 50 male annuitants who had attained the age of 90 in the years 1920–2 and were under observation until death. None of the males survived to 100; 4 females lived to 100, and one to 102. Of course, graduating such scanty numbers is not much more than an amusement, but we found that they were not badly smoothed by a formula which involved the ultimate constancy of q_x—i.e., the probability of dying between the ages of x and $x+1$, for a value of q_x much below unity—0.439 for women, 0.544 for men. Now *if* this were verified by an experience of not 240 but hundreds of thousands of lives observed from the age of 90 to death, it would imply that the length of days of Methuselah is not an impossibility but merely a very improbable event. If the limiting value were 0.5, then the chance of a centenarian beating old Parr's alleged record would be 0.5 raised to the 52nd power—a rather small fraction, but still finite. It would be interesting if someone with leisure would collect more data. Modern annuitant experience no doubt does not run to hundreds of thousands of lives beyond 90, but surely to some thousands.—I am, etc.,

Loughton. MAJOR GREENWOOD.

Psychiatry in the Services

SIR,—I read Wing Cmdr. K. G. Bergin's letter (Oct. 13, p. 508) with great interest. As a neuropsychiatrist working in an E.M.S. hospital for the past five years I have had ample opportunity of assessing the reactions of Service personnel to psychiatric interference. It is a well-known fact that attempting to cure neurosis is an almost hopeless task when the patient is obtaining some advantage in his present environment by being ill.

However, I would not agree that such individuals "have, by conscious or unconscious deception, achieved their object." In my experience actual deception is rare, and in the vast majority of cases the symptoms are truly neurotic—i.e., expressions of disordered emotion over which the sufferer has no control unless given further insight. Had the psychiatric reports referred to gone a little deeper they might, in nearly all instances, have given evidence of unhealthy emotional attitudes in childhood, usually engendered by unsatisfactory home influences, and leading to the acquisition of fixed modes of reaction which the individuals are doomed to carry with them for the rest of their lives. It would appear that childhood experiences act as a prototype for future orientation to society, and just as trained animals bring forth their conditioned responses on the slightest provocation and without thought, so may it be truly said that the child is father to the man.

Since neurosis is thus usually a lifelong complaint with recent exacerbations due to excessive stress, it is not surprising that it takes a long time to eradicate, and anybody who hopes to be able to do this under the limitations of time imposed by the necessities of Service life is not a psychiatrist but a fool.

However, there is always the other aspect—social adjustment, which in the case of the Services means the ability or otherwise to make a useful contribution to the common effort. Most neurotics are capable of so contributing provided the motivation is strong enough, and as the mere fact that they are not doing so is an indication that the usual motive of duty to country is not effective with them, some other—i.e., escaping punishment—might well prove an effective substitute. If this line of approach were to prove a success under wartime Service conditions one cannot help wondering how far it would act in peacetime.

During recent years it has been very noticeable how many hospital out-patients have imposing symptoms which, on careful investigation, prove to be without physical foundation. During an inquiry into possible psychological factors one usually gets the request for "a note for the Labour Exchange" recommending transfer from the present job, to which they have been directed, to another, usually more pleasant, of their own choosing; compliance with such a request nearly always results in a dramatic relief of symptoms. But it is still a fact that nearly all such cases are true neurotics and that deliberate malingering is rare. Is one to take the attitude that such people are not pulling their weight and are therefore enemies of the State, to be dealt with by harsh methods, such as the suggested imprisonment, until they decide to stop making capital out of their weakness? If so, the results might be amazingly good from the point of view of checking invalidism, but does this not imply an altered medical outlook—i.e., the patient is no longer entitled to health for its own sake and as a means of helping him to enjoy life more, but only so far as it fits him for contributing to the total effort of the State?

There is an unpleasant element of totalitarianism about such methods, which are also not without their dangers. For example, I know of at least two soldiers whose complaints had been dealt with after the manner suggested by Wing Cmdr. Bergin who confided to me that they had obtained a loaded rifle and lain in wait for their oppressors, fortunately changing their minds at the last moment. Mass outbursts of delinquency among the general public are not pleasant to contemplate. Is it not possible that the incidence of neurotic breakdown in the Services is largely determined by the restrictions on personal liberty which have necessarily to be imposed?—I am, etc.,

Bromsgrove. J. L. CLEGG.

SIR,—I was very interested to read Wing Cmdr. K. G. Bergin's letter, as it raises problems which some of us have been trying to solve for some years past. Let me assure him that the average Service neuropsychiatrist is as cynical as himself, and only too well aware of the fact that his patient may make a rapid recovery just as soon as he is sure of his "ticket." But whether it be pandering or no, it is surely good, sound common sense to place "bad psychiatric bets" in low medical categories. Constitutional inferiors and hysterics have not been wanted on active service during the war as they have an unpleasant tendency to break down at awkward moments and exert an undesirable effect on the morale of their comrades. That they are encouraged thereby to persist in their symptoms, with invaliding as their eventual goal, is unfortunate, but probably inevitable. It is no new thing to discover that punishment will frequently succeed where other forms of treatment have failed; but the punishment must represent something worse to the patient than the ordeal which he is hoping to avoid. For example, it is not going to cure a hysteric to send him to detention for twelve months if thereby he misses a series of Russian convoys.

In 1942 the Navy opened a special camp to which those who were suspected by psychiatrists of making the most of their symptoms could be drafted. They were under executive command and subject to ordinary Naval discipline; their symptoms were ignored so far as possible, and no limit was set to their retention in the camp. By such means it was found possible to salve many who would otherwise have required invaliding, but careful placing in various forms of restricted service was necessary in the majority of cases to achieve this result. But the chief value of this unit lay in the fact that the depot psychiatrist could assure the "non-trier" that there was no "ticket" for him, but a draft to a nasty place if he did not begin to help himself. Even so, a large number of hysterical and inferior personalities proved resistant and required invaliding.—I am, etc.,

R. R. PREWER,
Surg. Lieut.-Cmdr., R.N.V.R.

SIR,—The letter of Wing Cmdr. Bergin contains just that kernel of truth that so often makes so much mischief in generalities. There is none amongst us who has spent the years of war in the Services who has not seen just the case he describes: the man bordering on the anxiety state, a constant burden to his medical officer with his manifold complaints, until finally he is invalided on psychiatric grounds, often to recover with amazing rapidity as he returns to his more normal environment. Must the psychiatrist and the system be condemned if this man

is happily healed and the Service rid of one who can never be other than a liability?

Wing Cmdr. Bergin, writing no doubt as a medical administrator, treads on dangerous ground if he further inculcates in others the unjust attitude of mind that the Service doctor should think of those who complain of such symptoms as he describes first as scheming "racketeers" and only secondly as the sick in search of relief. There is no essential difference between the symptoms and the ills of those in the Services and those we treated in days of peace. A few, a very few of each, in both the Services and civilian life, make much of their malady with an end in view; the remainder, the huge majority, have aches and pains for which an organic cause may or may not be found, perhaps depending not a little on the diagnostic acumen and enthusiasm of their doctor, but for which they earnestly and rightly seek help to be rid of. What matters it whether the surgeon or the psychiatrist succeeds? Let us as doctors in the Service remain clinicians primarily, seek for our cures first through the science of medicine, retain the spirit of detached sympathy, and leave the cynicism to others.—I am, etc.,

G. A. JAMIESON,
Wing Cmdr., R.A.F.V.R.

Inverness.

SIR,—Wing Cmdr. K. G. Bergin (Oct. 13, p. 508) should be very careful. He is on dangerous ground. He talks great wisdom when he speaks of "a system which lays too much stress on psychological illnesss and not enough on a man's responsibility to his fellows," because lack of this responsibility, or, more positively, the weakness of selfishness, is probably the most common fault of us all, beginning in childhood. But of all systems to-day modern psychiatry is not the offender to be taken to task. An experienced medical psychologist is very much concerned with responsibility to one's neighbour, for this is the very essence of his definition of sanity.

If the individual Army psychologist happens to invalid out of the Army some cases which Wing Cmdr. Bergin finds curable by the no less worthy psychological method of punishment, then indeed we may claim the converse to be true—that a future suicide might be punished instead of being discharged to "carry on a greyhound business" or "cycle merrily home five miles to work in his garden." It may be some years before he joins the ranks of those poor wretches who blow their brains out in the Army or reach the overcrowded mental hospitals. Indeed, Wing Cmdr. Bergin might never hear of the incident, but if the decision were his then his responsibility to that individual, his neighbour, would remain.

Furthermore Army psychiatry is a child of 5 years of age; its members are many of them inexperienced. If its inexperience leads to the lame leaping for joy, the blind seeing, and dyspeptics eating large indigestible meals, then it has a powerful future. But I feel that even psychiatrists cannot produce this Christ-like scene of joy. The majority of the men and women discharged from the Services for neurosis are now being treated under the after-care scheme of the Board of Control.—I am, etc.,

JOHN A. MCCLUSKIE.

Surrey.

SIR,—I am sure that Wing Cmdr. Bergin's eminently sensible and vigorous letter crystallizes the views of many serving medical officers who have had to treat "those unwilling to bear the heat and burden of the day." As an Army dermatologist I have wasted much time attempting to treat such patients; those whose somatic manifestation of a disturbed psyche takes the form of a rubbed and excoriated dermatosis are known to all dermatologists. There appears to be no answer to cases of this type. Continuous narcosis, occlusive dressings, and appeals to their non-existent better natures may lead to a temporary remission, but there is an invariable relapse once they return to their uncongenial environment. A number of these patients spend a period under detention for absenteeism, but many escape from this with their lesion conveniently secondarily infected (they avoid reporting sick until it is in this state), and spend the remainder of their sentence in the comfort and security of a military hospital skin department, where they enjoy the same amenities as those invalided from operational theatres over-seas.

A few months of military dermatology make one realize that these patients are a liability to the Army Medical Service, and they are eventually written up for a medical board which will invalid them out. While awaiting their board one observes, in the less astute, the transformation to which Wing Cmdr. Bergin draws attention. The hang-dog look disappears, and the traumatized skin heals with amazing rapidity. Should the medical board decide, however, that the patient's disability does not warrant discharge there is an equally rapid relapse. In brief, these patients literally scratch their way out of the Service. Unlike those of their brethren with vague headaches and dyspepsia of nervous origin they have something "to show," which enables them to preserve their ego; at the same time they possess a most effective lever for escape.—I am, etc.,

PATRICK HALL-SMITH,
Capt., R.A.M.C.

Hove.

SIR,—I was touched by Wing Cmdr. Bergin's cry from the heart, and would beg the hospitality of your columns in order to offer him a little solace in the difficult formative period through which he is now passing.

It should comfort him a good deal, in the first place, to make him aware of some of his more glaring factual inaccuracies. In all Services during the war the rate of return to full duty of psychiatric cases has been about 80%, and far from this being "most disappointing" it has sustained mightily those whose work has lain in this field. In the second place, he himself gives, with admirable clarity, the chief reasons for disappointing results. If Wing Cmdr. Bergin always ensures that every psychiatric patient has a "clean bill of health" from every other specialist to whom he has access, and then refers his case to a psychiatrist in a spirit of "diagnostic destitution," then he must not be surprised if results are not always what they ought to be. Promptness of diagnosis, early treatment, and disposal are the keystones of management in these cases, as has been emphasized in the war literature over and over again. However, I think it would be a great mistake to assume that this practice, mentioned by Wing Cmdr. Bergin, is widespread or even common. A very large majority of medical officers with Service experience can diagnose these cases quickly and competently, and, where an ill is a minor one, treat them very satisfactorily. All psychiatrists would agree that it is no more desirable to refer every psychiatric case to a psychiatrist than it is to refer every sprained ankle to a surgeon or every case of wax in the ear to an E.N.T. specialist.

I could not understand why Wing Cmdr. Bergin should be troubled by an autogenous cynicism because his patients showed a decent and restrained jubilation at the prospect of being invalided. I have not observed deep depression as a common phenomenon in the pre-invaliding phase in any type of patient, whether psychiatric or not. It is worth recording, indeed, that great unhappiness at the prospect of invaliding is a very common feature of schizophrenia.

I would whole-heartedly agree with his observation that imprisonment is beneficial in many psychiatric reactions. There is little that is novel in this observation, for it was observed many, many years ago that the regular routine life, good food, and open-air conditions of a well-ordered prison might produce beneficial results in the psychoneurotic. There are, however, certain difficulties about adopting this as a consistent mode of therapy. In the first place, psychotic reactions have not been observed to benefit, nor do the more severe types of depression appear to improve, under these conditions. There is also the trifling matter of the ethical justification of such procedure. I do not doubt, of course, anything Wing Cmdr. Bergin says, but I can only wonder at the truly remarkable spirit of co-operation shown by his executive colleagues, who will collaborate with him in this novel mode of treatment.

Finally I would like to commend the thesis of incapacity, as opposed to unwillingness, as an object of Wing Cmdr. Bergin's most serious study, for there is a very definite school which accepts the existence of mental illness as opposed to the thesis of calculated villainy. I should estimate this school as amounting to some 99% of the medical profession, and it must, therefore, if only by virtue of numbers, command some respect.—I am, etc.,

GERALD GARMANY,
Surg. Lieut.-Cmdr.

R.N. Auxiliary Hospital, Barrow Gurney.

Fenestration for Otosclerosis

SIR,—As one who has taken an active interest in fenestration for otosclerosis continuously since 1932 I read your leading article on this subject (Sept. 29, p. 430) and also the three letters by Messrs. N. Asherson, E. Carew-Shaw, and E. R. Garnett Passe (Oct. 13, p. 509). While I entirely agree with the admirable balanced remarks of the first and last named writers, I cannot agree in any respect with those of Mr. Carew-Shaw. There is no getting away from the fact that the region of the labyrinth is one where unskilled, half-trained, or injudicious surgery is fraught with the greatest danger. "Fools rush in where angels fear to tread," and to suggest that the operation need not "remain in the hands of a few with special aptitude" to my mind is asking for trouble, and it is certain sooner or later to bring this procedure with its definite field of usefulness into discredit. Rather let it only be performed amid ideal surroundings, and let it remain in the hands of those competent aurists who *have* studied the anatomy and the technique and, by repeated experimentation on the cadaver, have acquired that intimacy with the fine points of the operative steps which alone can ensure freedom from risk and a reasonable chance of satisfactory results.

The operation, whatever may be said to the contrary by the few, is definitely an intricate one, and therefore must never be embarked on by anyone with a passion for "operating against the clock."—I am, etc.,

Salisbury, C. A. HUTCHINSON.

Acute Inversion of the Uterus

SIR,—I was very interested to read Mr. J. V. O'Sullivan's article on the treatment of acute inversion of the uterus (Sept. 1, p. 282), and would like to add yet another instance of his method having been used with success.

A primipara, aged 23, was admitted to St. Helier County Hospital at 7.20 p.m. on Sept 29. She had had a normal delivery of a 7½-lb. child in a local nursing home at 6.10 p.m. The first stage lasted 10 hours, and the second stage 2 hours and 10 minutes. Severe post-partum haemorrhage (2–3 pints) had necessitated an attempt at expression of the placenta, and this resulted in complete inversion of the uterus at 6.35 p.m. On admission she appeared to be moribund, and the accompanying midwife had felt sure she would die in the ambulance. Her colour was grey and the pulse imperceptible. Before attempting any other examinations, blood transfusion was started and she was given 2 pints under pressure within half an hour of admission. This resulted in very slight improvement, and it was just possible to feel radial pulsation, though the rate was uncountable and the blood pressure could not be recorded. At 8.30 p.m., after further transfusion and methedrine, she was exposed sufficiently to make a gentle examination of the uterus. The placenta was found to be almost completely adherent to the fundus, which extended half-way down her thighs. There was only slight bleeding. The patient's condition deteriorated after this minimal interference, and our idea of peeling off the placenta and replacing the uterus in the vagina was therefore abandoned. Transfusion was continued until 9.30 p.m., when she had had nearly 8 pints of Rh-negative blood. She was steadily getting worse, had lost a further pint of blood, and appeared to be at the point of death. It was decided that the only possible treatment was to remove the placenta and replace the uterus. She was anaesthetized with cyclopropane, the placenta gently peeled off with some difficulty, and the uterus eased back into the vagina. A "dettol" douche was then used to balloon the vagina, and the uterus immediately returned to the abdomen. Ergometrine was given intravenously and intramuscularly.

There was a dramatic improvement. Half an hour later the blood pressure was 140/70 and her pulse could be easily counted at the wrist, though its rate was 156 per minute. The transfusion was stopped. Improvement was maintained till 11.30 p.m., when she suddenly became severely shocked again, with an uncountable pulse and a systolic blood pressure of only 60 mm. The uterus was firmly contracted and there was not any vaginal bleeding. Methedrine was given and transfusion started in a saphenous vein, but the peripheral circulation was so poor that it was difficult to keep it running fast. During the next three hours there was gradual improvement. The blood pressure rose to 90/40 mm., and her pulse rate fell to 150–160 per minute. By that time she had had 10 pints of blood in all, and a slow saline drip was continued for a few more hours to ensure the patency of a vein should she get worse. At 7.30 a.m. her pressure was 104/70 mm. and the pulse rate 140 per minute. Since then she has not given us any cause for anxiety, though her haemoglobin two days later was only 54%. Serology has not shown any evidence of haemolysis. Prophylactic sulphadiazine and *B. welchii* serum were given, and her temperature did not rise above 100.4° F. She was apyrexial six days after delivery, when she was given a transfusion of 400 c.cm. packed red cells. She was discharged on the sixteenth day with a haemoglobin of 72%.

I feel certain that this woman would have died if we had not known of this simple method of correcting the inversion. It was interesting that such strenuous efforts to combat the shock were quite ineffective until replacement was carried out, and it would seem advisable in similar cases to interfere at once if resuscitation by the usual methods failed, no matter how desperate the patient's condition.

I am most grateful to Mr. O'Sullivan, who was good enough to come and give us invaluable help in the management of the case.—I am, etc.,

Carshalton, Surrey. DOREEN DALEY.

Volvulus of Small Intestine

SIR,—The report of a case of volvulus of the small intestine by Major R. Salisbury Woods prompts me to recount a case I had in September, 1944.

The patient was a married woman aged 33, multip. 5 months; before marriage she was a sister at the local hospital. On Sept. 28, 1944, about 4 a.m., I was called to see her on account of a sudden acute abdominal pain and vomiting. No previous history of abdominal pain or discomfort. No previous operations. Temperature and pulse normal. Pain referred to lower abdomen. No distension and no tenderness. Bowels open the evening before. An enema given later in the morning produced a good result, and was followed by complete relief. Seen again the evening of Sept. 28; no pain and quite comfortable.

While operating on the afternoon of Sept. 29 I received a telephone message from the husband to say that his wife had more acute abdominal pain and had been sick several times. I had her admitted into hospital at once, and when I saw her about half an hour later she was in great pain; the abdomen was distended and there was an irregular tender mass to be felt in the lower abdomen to the left of the midline. I opened her abdomen one hour later—midline subumbilical incision—and found a complete volvulus of the last foot of small intestine, which was due to the bowel becoming attached to a large "solitary" caseating gland in the mesentery of the small intestine. The gut was black and showed no signs of recovery on unwinding the volvulus. About a foot of small intestine was resected and an end-to-end anastomosis performed. The offending gland was removed. She was a grand patient and made an uneventful recovery.

On thinking over the case, although I was somewhat dismayed to find a gangrenous bowel at operation I did not feel justified in opening her abdomen sooner than I did. As in Major Salisbury Woods's case, it is obvious now that the early signs and symptoms were (to quote his apt description) "due to a subacute volvulus in which the affected loop was swinging like a ship at anchor, partially folding over and then swinging free again until it 'stayed put' some 36 hours later." Despite diet and various medicines the bowels are a little troublesome: 2 to 3 times a day, and there is nearly always a fairly urgent call; otherwise all well.—I am, etc.,

D. J. P. O'MEARA,
Bury St. Edmunds. Hon. Surgeon, West Suffolk Hospital.

SIR,—I was very interested in the note by Major R. Salisbury Woods on volvulus of the small intestine (Oct. 13, p. 496). I agree that under the conditions of European practice it is a rarity, but this is not so everywhere. Between 1919 and 1932 while working in the western United Provinces of India I had occasion to operate on about 60 cases of intestinal obstruction (apart from strangulated hernia), and of these no fewer than 12 were cases of volvulus of the small intestine. Why the condition should be common there is not clear, but the following facts are suggestive.

"Intestinal colic" with constipation is very common in India. The traditional treatment is castor oil and opium, which soon relieves the milder cases, however unorthodox and alarming to

Western ideas. But the more severe cases approach the character of intestinal obstruction, with marked distension, shock, and even vomiting of intestinal contents, though sudden relief may come after repeated large slow enemata or even without treatment.

Indian patients refuse operation as often as not, and of those whose condition justified a diagnosis of obstruction by all ordinary standards a surprising number (about one-fifth of the total) recovered after one, two, or even three large slow enemata. One patient was so ill that he died a few minutes after a third enema had produced a copious watery motion. At necropsy it was evident that a volvulus had existed and become unwound. The affected loop was increasingly congested as one traced it downwards, with many ecchymoses, especially on the anti-mesenteric border. The congestion ceased abruptly at the lower end, and on the root of the mesentery was a deep groove where the bowel had crossed it. This is exactly the picture found at operation after relieving the severer cases of volvulus of the small intestine. In another obstruction case I found what I believed to be a later stage of the same picture. A year after a severe "colic" attack I found a large loop bound down at both ends to a scarred and thickened mesentery. Here the damage must have been greater, for at the scarred upper end was a stricture which had brought the patient to the operating table.

It is remarkable that both "colic" cases and those of volvulus nearly always gave a history of a large meal of coarse, indigestible food—badly ground millet, half-cooked grain, or certain green leaves (gunyan), all of which have the reputation of giving colic. From a search of such literature as was then available to me I gathered that volvulus of the ileum was not uncommon in Southern Russia, where the poorer classes consume large quantities of millet and other coarse grains. From these facts I believe that volvulus of the small intestine is not unusual in races whose food leaves a large indigestible residue (Indians excrete twice as much faeces as Europeans), and that spontaneous resolution is quite common.

I am in complete agreement with Major Salisbury Woods's picture of the loop folding over and then swinging free again, and I agree that in early cases when congestion is slight the appearances are so puzzling that the condition is easily overlooked. Eventually I learnt to recognize the volvulus by sweeping a finger round among the intestines in the right lower quadrant of the abdomen when it encountered a band of resistance. It was, I suppose, the pedicle of the volvulus; at any rate there was something going back to the lower part of the root of the mesentery which did not slip away before the finger as it should.

In these Indian cases the volvulus involves several, even many, feet of the ileum, and it is quite difficult to be sure when the reduction is complete without more manipulation than one likes. The affected coils contain little gas and may be very heavy with liquid contents and undigested food, which may account for the production of the volvulus.—I am, etc.,

R. C. McWatters,
Military Hospital, Penshurst. Lieut.-Col., I.M.S. (ret.).

Operation for Varicose Veins

Sir,—Mr. Harold Dodd (Oct. 13, p. 510) has done a great service in calling attention to the importance and difficulties of this subject. His statement in which he advocates that a "pool" of information is necessary brings out the fact that there is no 100% cure for varicose veins, and that, furthermore, there are many and varied opinions and techniques being practised by those interested in this fascinating subject. Most of us will agree that the operation is one which calls for the greatest care, and should be treated as a major surgical procedure. Economic conditions and the shortage of beds necessitate in many instances the use of out-patient procedure. However, even though this may be a necessity, such operations should be performed in a major theatre with all facilities for absolute sterility and for expert assistance. My attention has been called recently to certain tragedies which might have been avoided had these points been better appreciated. To mention a few: sepsis, sloughing from sclerosant injections, emboli, tearing of the femoral vein, and even ligature of the femoral artery, have occurred in the hands of qualified practitioners. The fetish of a minute incision performed in a poorly equipped out-patient theatre should be discarded.

Again, the use and abuse of sclerosants at *the time of the operation* is a subject which calls for further investigation. There are two schools of thought in this matter. Should both legs be dealt with at the same operation, or should the operation come into line, say, with that of double hernia, in which I believe the practice of dealing with one side at a time to be the usual procedure?

There are countless other "differences of opinion," and there seems to be but little correlation of the late results following the various and varied techniques. Mr. Dodd's letter will have been a great service if it serves to call together those of us who are struggling with this problem of the vagaries of the varix.—I am, etc.,

London, W.1. R. R. Foote.

Nerve Injuries in Children

Sir,—I should like to thank Mr. St. Clair Strange and Mr. Zachary (Oct. 20, p. 545) for their letters correcting the obvious mathematical error in my article of Oct. 6. The figures should have read 15 mm. a week and not 15 mm. a day. This is in line with Mr. Zachary's figure of 2.1 mm. a day.

Although 2.1 mm. a day does not appear to be a great increase upon the oft-quoted figure of 1.0 to 1.5 mm. a day for the rate of recovery in an adult, it is in my opinion much greater than the figures suggest.

The rate of recovery of nerve injuries in adults is very rarely as rapid as 1.0 mm. a day. In fact, the rate of recovery in adults in our own cases and those of other surgeons, which we are treating, is disappointingly slow.

The case referred to in my article of Oct. 6 was seen in May, 1944, in the out-patient department of the Royal National Orthopaedic Hospital, Great Portland Street, and was operated upon two weeks later. Both before operation and twelve weeks after operation she was also examined by my colleague, Mr. Donald Norris. The patient, Miss P., is now employed in the telephone exchange of the Royal National Orthopaedic Hospital, Stanmore, and is most co-operative in demonstrating her result to anyone who may be interested.—I am, etc.,

Royal National Orthopaedic Hospital. E. Hambly.

Caffeine and Peptic Ulcer

Sir,—Your annotator ends his article (Oct. 13, p. 504) with these words: "... at least an adequate justification for eliminating caffeine-containing beverages from the diet of ulcer patients." Why not put it in plain English? Ulcer patients are not to be allowed tea or coffee. Now the cup of tea is an institution without which no charlady, Service man or woman, private or colonel would complete a day's work. Tea was one of the few luxuries that Lord Woolton maintained during the blackest period of the Battle of the Atlantic. It fetches an enormous price in the "black market" on the Continent.

What is the evidence for its denial to the ulcer patient? An American youth who perforated after drinking 150 bottles of coca-cola; a resistant duodenal ulcer in a patient who was a coca-cola addict; experiments on cats which show they develop engorgement of the gastric mucosa after the injection of 250 mg. of caffeine sodium benzoate (the equivalent weight for weight of an average man drinking 50 cups of tea). It is difficult enough to persuade an ulcer patient to stick to a regime, but to deny him tea and coffee on these grounds will undermine any faith he may have in his doctor.—I am, etc.,

R.A.F. Station, Keevil, Wilts. J. S. Astbury.

Epidemic Diarrhoea and Vomiting

Sir,—We have read the very interesting paper on epidemic diarrhoea and vomiting, etc., by Drs. George Brown, G. J. Crawford, and Lois Stent (Oct. 20, p. 524), and think that our experiences during an outbreak in July, 1945, in this hospital might be of interest to your readers.

This hospital has a population of about 2,000 patients and resident staff, but the outbreak was practically restricted to female staff and patients. Altogether about 130 out of a female population of 1,300 became ill. This is all the more remarkable as one of the female wards with a morbidity of about 25% lies within the "male side" of the hospital. This is a female infirmary ward, and the patients are not much in contact with other patients. We could

not find out how the disease spread to this ward. Both staff and patients were involved, but the first nurse fell ill four days after the first patient, so that it does not seem likely that the nursing staff were the carriers; we thought one nurse might have been a carrier but were unable to find proof. The very few male patients affected fell ill only towards the end of the epidemic, so it is unlikely that it started on the male side. Another remarkable feature was that in spite of precautions the disease spread rapidly within the female wards affected, with a morbidity of between 10% and 50%, but it did not spread at all in the male wards. In one six-ward block all wards were affected, and in a second only four wards were affected. The epidemic started slowly on July 1 and petered out towards the end of the month.

Bacteriologically, we did not find any non-lactose-fermenters at first, but later on, when strict orders had been given to send the very first diarrhoeic stool passed—and this was not always possible—a number of non-lactose-fermenters, not of the typhoid-dysentery group, appeared. The table below contains the detailed findings in fifty cases as compared with the same number of stools examined as a routine. It shows a considerable percentage increase in the number of organisms regarded by some workers as pathogens but by others as concomitants only.

	Routine Material	Epidemic Material
Negative	45	36
B. faecalis alcaligenes	1	3
B. coli anaerogenes	—	1
B. morgani	—	3
N.L.F. *B. coli*	—	1
B. paracolon types	3	2
Others	1	4
Total	50	50

Under the item "Others" we include five organisms which were non-lactose-fermenters but which gave varying fermentation reactions and which could not be identified serologically.

As the illness was definitely a clinical entity, while the bacteriological findings were not, the results support the views of those authors who think that these organisms grow more freely in diarrhoeic stools but have nothing to do with their causation. Unfortunately the disease occurred during a shortage of medical and laboratory staff caused by the holiday period and other reasons; consequently it was not possible to investigate the haematology, etc., and we could not even make a deductive guess as to the origin (bacterial or virus) of the epidemic.—We are, etc.,

H. H. FLEISCHHACKER.
R. F. LANE.
L. A. F. WARNE.

Shenley Hospital, St. Albans.

Young Nurses in Tuberculosis Wards

SIR,—A circular has recently been issued by the Ministry of Health which indicates that the Minister is not prepared to take action to stop the recruitment of very young girls—mere children, indeed—for work in acute tuberculosis wards. Here is a definite instance.

On her 16th birthday M. B. started a nursing career in a borough isolation hospital, being put to a tuberculosis ward. Within a few weeks she was under treatment for erythema nodosum, but soon returned to work, this time on night duty. Within a few months she complained of an aching knee and of feeling "so tired"; she was told this was a quite common experience. Her 17th birthday found her entering a tuberculosis hospital as a patient with established disease of lungs, knee, and kidney. Two and a half years later she was still there, hovering between life and death.

In the nursing papers advertisements were still appearing for girls of 17 or under for this same isolation hospital, which is a unit in the Public *Health* service of this country.—I am, etc.,

ESTHER CARLING.

Northwood.

Doctors in Uniform

SIR,—It has occurred to me, in reading the many letters published in your *Journal* from R.A.M.C. officers complaining of their lot, that few of them have approached their Service from a realistic point of view. Their complaints may be summarized into two main groups: (1) lack of professional work, and (2) complaints generally about the administrative and disciplinary aspects of the Services.

Under the first head the fault is, I think, that some medical officers failed to realize that they held commissions in the Army and regarded themselves as doctors only—not accepting the fact that they belonged to the most fortunate profession in wartime in so far that they were allowed to continue with their profession in some degree, in contradistinction, say, to a lawyer or other professional man who might be an infantryman or a gunner. In other words, "there was a war on" and "there were regimental duties to be done." Incidentally they were paid at a higher rate than any other Services, and some of the grumblers even had exalted ranks. In my experience the good and keen regimental medical officer seldom complained of lack of work, and many of them were indeed overworked. War inevitably at times produces for everybody periods of boredom and inanition.

The second complaint is largely explained, too, by the above; but in addition there was an undercurrent of distrust of the regular R.A.M.C. officer, and a reaction that any instructions issued by him must be professionally inadequate and administratively bound up with red tape. Nothing could have been less true. The majority of the Regular officers it was my privilege to serve with were first class professionally, and were certainly better read and informed on non-professional subjects than their civilian counterparts.

Most of the complaints I heard were the result of ignorance of the duties of an R.A.M.C. officer on the part of the complainants. So many admitted that they were only interested in medicine, and resolutely refused even to try to learn or understand Army procedure. Of course I am only speaking of the grumblers. The large majority of the emergency commissioned officers tried to learn the new aspects of their job, and succeeded in learning them, as the wonderful record of the medical services in this war clearly shows.

May I add that I speak as a non-Regular. My experience of the Territorial Army dates only from July, 1939, but I am grateful for having had the honour and opportunity of serving with the R.A.M.C.—I am, etc.,

L. J. HAYDON,
(Late) Lieut.-Col., R.A.M.C.

Rehabilitation of Skin Patients

SIR,—You published a very excellent paper on "Rehabilitation of Patients suffering from Skin Disease" by Major R. Mason Bolam (Oct. 20, p. 539). In it he describes the work done at Ragley Hall British Red Cross and St. John Auxiliary Hospital in Worcestershire. It is one of the hospitals which was included in my area as Inspector for War Organizations during the last six years. I have repeatedly in my reports on this hospital pointed out to the Director of Medical Services, General Ainsworth, the excellent work which I have witnessed here. I should like to say how much I endorse everything that Major Bolam says and how thoroughly I agree with his conclusions at the end of his paper. May I add that the organization and treatment could only have been carried out by a wonderful team of workers. I refer, of course, to the Commandant and the Matron and her staff: they certainly deserve all the praise that can be given.—I am, etc.,

R. G. HOGARTH, F.R.C.S.,
Inspector of Hospitals for Regions 9 and 3.

Nottingham.

Permission for Aliens to Practise

SIR,—I wish heartily to endorse the plea made by Dr. Harold Sanguinetti (Oct. 13, p. 514) for allowing "enemy alien" doctors to continue to practice their profession in this country. I would also add that the permission should include "friendly alien" doctors who may have unhappy memories which they do not wish to awaken by returning to their own countries. I believe it is against our principles of humanity to force those to whom we have given refuge to return against their will, and unfair to use their services for our advantage and dispense with them when our need is less critical. Apart from the justice of the matter, it would appear from the numerous articles which have been written recently that there will be a great shortage of doctors for many years, so the services of any foreign doctors who care to remain can only be of advantage to this country.

While I hesitate to believe that the Government is waiting for an expression of medical opinion, I do think such an expression would be helpful, and appeal to all those who agree to ensure that their views are made known in the right quarter.—I am, etc.,

JANET M. DONE.

Leicester.

Obituary

SIR LISLE WEBB, K.B.E., C.B., C.M.G.

Brevet Colonel Sir Arthur Lisle Ambrose Webb, who died on Oct. 7, was born on July 19, 1871. He received his medical education at University College Hospital, London, and took the Conjoint qualification in 1895. At the outbreak of the South African War in 1899 he was a district surgeon under the Basutoland Government, and immediately resigned his appointment and joined the R.A.M.C. He served throughout the war, for which he received the Queen's Medal with five clasps and the King's with two clasps. After the war he took the diplomas in public health and tropical medicine and hygiene. During the war of 1914–18 he served as an Assistant Director-General of Medical Services, and was mentioned in dispatches, awarded the C.M.G., and given the rank of brevet colonel. For his service during that war he was further, in 1919, awarded the C.B.

After the Armistice in 1918, and the consequent mass demobilization, the Ministry of Pensions was faced with the task of assessing the amount of disablement suffered by the many thousand claimants for compensation, and of providing in- and out-patient treatment where necessary. Lisle Webb was appointed Director-General of Medical Services to carry out this task, and in a comparatively short space of time medical boards were in continuous session throughout the country, and hospitals and clinics for the exclusive needs of ex-Service men were established in the large towns. Webb's work in this connexion was rewarded by the well-merited honour of K.B.E. He had been seconded to the Ministry from the R.A.M.C., and later it became a question whether he should return to the Army or not. He was, however, so obviously the man to continue directing the work which he had begun so well that his appointment in the Ministry was confirmed, and he retired from military service and became a civil servant. He continued in this position until the end of 1933, when he retired. Webb's success, while due largely to his own inherent ability, was in no small measure contributed to by the willing and efficient service rendered by his staff to a chief who considered them in every way. A piece of work well done won from him the praise which incited to fresh efforts; work was never allowed to accumulate while an official was on leave; any indication of overwork or ill-health was always met by an instruction to take the necessary rest.

When he retired in 1933 he did not sever his connexion with the Ministry, but filled the post of Secretary and Treasurer to Queen Mary's Hospital, Roehampton—an institution in which he had always taken the greatest interest, and for whose efficiency he was largely responsible. He finally retired in 1942, and spent most of his time at his home in Balcombe Forest.

He was a Knight of Grace of the Order of St. John of Jerusalem and an Honorary Fellow of University College Hospital. On his retirement from the Ministry of Pensions he was appointed consulting physician to that Department.

D. C. RAYNER, Ch.M., F.R.C.S., F.R.C.O.G.

We regret to announce that Emeritus Professor D. C. Rayner, who held the chair of obstetrics in the University of Bristol for six years, died in a Clifton nursing home on Oct. 21, aged 80. He still saw some patients until he himself became ill a short time ago.

David Charles Rayner was a student of the Bristol Medical School, and took the M.R.C.S., L.R.C.P. diplomas in 1892. He obtained the F.R.C.S. in 1896, became an original Fellow of the Royal College of Obstetricians and Gynaecologists in 1929, and received the Ch.M. degree from Bristol University in 1930. After graduating he worked for a time in the physiological laboratories, and then joined the staff of the Bristol Maternity Hospital. He was appointed assistant obstetric physician to the Bristol General Hospital, and reached the senior staff in 1923. He became director of clinical obstetrics in the University of Bristol in 1925, a year before his election as professor of obstetrics, and on his retirement from the chair at the end of 1932 he was made emeritus professor. He was for some years an examiner for the Central Midwives Board for England and Wales, and examiner in obstetrics for the University of Wales. At the Annual Meeting of the British Medical Association held at Bath in 1925 he served as vice-president of the Section of Obstetrics and Gynaecology, and he was also a past-president of the Bristol Medico-Chirurgical Society. He remained a member of the B.M.A. from 1894 until the time of his death. Prof. Rayner's published writings appeared in the *Lancet* (on rupture of the uterus in a case of normal labour), the *Birmingham Medical Record* (on puerperal sepsis), and the *Bristol Medico-Chirurgical Journal* (on the relation of gynaecology to the glands of internal secretion).

M. C. writes: Ex-students and nurses of the Bristol General Hospital will have read with distress of the loss of their old friend "Charlie Rayner." No man among the honorary staff won a greater measure of affectionate regard. His retiring and diffident manner, his unvarying kindness, courtesy, and charm, were coupled with considerable professional skill and experience. His modesty was quite disproportionate, but it failed to stem the growth of an enormous consulting practice. His services were freely available to all and sundry, at any hour of day or night. Not only was he unmercenary, but his generosity, or perhaps shyness, seemed often to prevent him from sending accounts even to the wealthiest of his patients.

Charlie appeared to have no hobbies or interests apart from his job, and when at home he lived with extreme bachelor simplicity and quietude, cared for by his devoted sister. Yet he was the friend of all, and no one in the West of England ever thought or spoke of him except in terms of the greatest warmth.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on Oct. 18 the following medical degrees were conferred:

D.M.—*W. E. Henley.
B.M., B.Ch.—I. G. Waugh, H. R. Smart, T. W. Price, *V. J. K. Wright, *E. L. N. Shoeten-Sack.

* In absence.

UNIVERSITY OF CAMBRIDGE

At a Congregation held on Oct. 19 the following medical degrees were conferred, all by proxy:

M.B., B.CHIR.—R. S. Lewis, J. A. R. Debenham, J. A. Rycroft, J. E. M. Whitehead, J. M. Cliff, E. D. Forster.
M.B.—W. A. Fell.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a quarterly Comitia of the College held on Oct. 25, with the President, Lord Moran, in the chair, Dr. E. Bellingham Smith, Prof. A. W. M. Ellis, Prof. J. C. Bramwell, Dr. J. L. Livingstone, and Dr. E. R. Boland were elected Councillors.

The following were elected representatives of the College: Dr. H. E. A. Boldero on the committee of management of the Conjoint Board, Sir Comyns Berkeley on the Central Midwives Board, and Sir Francis Fraser on the Poisons Board.

The President announced the award of the Jenks Memorial Scholarship to J. C. Camac, late of Epsom College, and the Gilbert Blane Gold Medal to Surg. Lieut.-Cmdr. F. P. Ellis, M.B., R.N. Dr. R. E. Lane was appointed Milroy Lecturer for 1947.

The Comitia of the College endorsed the unanimous recommendation of its Council that the present interests of the College would best be served by remaining in its present premises. In coming to this decision the College has had the benefit of the advice of a panel of experts.

Dr. W. Russell Brain will deliver the Bradshaw Lecture on "Speech and Handedness" on Thursday, Nov. 8, at 2.30 p.m.

Membership

The following, having satisfied the Censors' Board, were elected to the Membership of the College:

Ailsa Bannerman, L.R.C.P., G. A. Copping, M.D., Lieut.-Col., R.C.A.M.C., G. D. Daruvala, M.D., C. E. Davies, B.M., A. P. Fletcher, M.B., Surg. Lieut., R.N.V.R., J. E. Francis, M.D., W. Ganado, M.D., W. W. Gooddy, M.B., Capt., R.A.M.C., S. J. M. Goulston, *M.C.*, M.B., Major, G. I. C. Ingram, M.B., A. J. Kerwin, M.D., Squad. Ldr. R.C.A.F., F. J. D. Knights, M.D., C. A. Leeson, M.B., P. F. Lucas, M.B., M. B. McIlroy, M.B., W. E. Mahon, L.R.C.P., J. A. W. Miller, M.B., Major, R.A.M.C., F. E. E. Sargent, M.D., D. Shiers, M.B., A. J. Shillitoe, M.B., J. McN. Tainsh, M.B.,

S. M. Talaat, L.R.C.P., E. C. Turton, M.B., P. Venables, M.B., D. R. Wilkie, M.D., H. P. Williams, L.R.C.P., Major, R.A.M.C.

Licences

Licences to practise were conferred upon the following 184 candidates (including 29 women) who had passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board and who have complied with the necessary by-laws:

F. Alberts, R. C. Allison, Daphne S. A. Anderson, G. J. E. Ansell, E. R. Arnold, Lenorah M. Attkins, G. M. Bailey, Joan R. K. Bastable, J. G. Bearn, T. R. Bennett, F. M. Benton, M. Blackwell, Stella Booth, Camilla B. P. Bosanquet, Lesley M. McL. Bowen, H. L. Braterman, N. Brodie, D. E. St. J. Burrowes, J. P. Bush, I. Butler, N. J. Caldwell, Margaret Capra, C. L. Casimir, D. A. Chandler, D. J. Chapman, J. Clarke-Goldthorpe, J. P. Clayton, D. Cockcroft, N. C. Connell, D. E. Cullington, R. Davidson, R. H. Davidson, E. C. Davies, Elizabeth E. Davies, E. J. Ll. Davies, N. N. Davies, S. Davis, D. A. Dawson, C. H. de Boer, R. A. Denham, A. L. de Silva, D. C. de Ville, A. G. Dingley, E. M. C. Dunlop, A. L. T. Easton, A. McK. Elliott, E. Ellis, R. H. Ellis, R. F. Ewing, A. Fernandez, J. Fifield, M. L. H. Flindt, K. J. R. Ford, G. Forrester, W. S. Foster, A. E. Fyfe, G. F. J. Goddard, B. Gordon, C. W. Graham-Stewart, M. Grant, J. S. B. Greenfield, R. E. Gruchy, Tatiana P. Guercken, R. J. H. Guy, D. Hacking, H. M. Halle, Audrey Hanson, M. J. Harman, R. P. Harwood, A. G. Hayter, A. G. S. Heathcote, Mary Helmer, M. J. T. Hewetson, P. H. Hewitt, C. Hougie, Betty E. Howarth, D. E. Howells, C. H. A. Hoy, D. Hull, E. C. Hutchinson, M. S. R. Hutt, J. A. Hyde, C. C. Jackman, D. W. James, J. B. James, R. H. F. James, J. P. Janvrin, H. Jasowitz, P. M. Jeavons, F. F. Jerichower, D. J. B. Johnston, D. E. E. Jones, P. M. P. Jones, W. J. R. Jones, W. R. Juckes, H. T. Kay, H. E. M. Kay, Catherine M. R. Kirkpatrick, J. M. Kodicek, P. B. Kunkler, Stephanie A. Laing, H. A. Lane, J. G. Latimer, V. M. Leveaux, V. B. Levison, Helen M. Littler, Lilwen E. Lloyd, W. H. Lonsdale, J. D. Lucy, Joan V. Macdonald, R. C. McGregor, C. McIver, J. McMillan, P. N. Magee, J. E. Marrett, Margaret L. V. Matthews, M. Mattinson, W. G. Miln, M. Mir-Fakhrai, W. T. S. Moore, T. H. Morgan, D. R. Murley, R. R. W. Nichols, W. Niman, D. E. Oakley, Mora A. C. O'Hanlon, D. O'Keeffe, Liliane Parkinson, Deirdre Paulley, J. P. Penson, I. M. Perkins, P. J. Preston, A. H. C. Ratliff, J. W. T. Redfearn, P. A. Reed, N. C. Rees, Rosemary J. Reynolds, L. F. Richards, Rachel Richards, K. E. Rimmington, P. A. Ring, K. B. Roberts, J. O. Robinson, N. Rosedale, D. E. Rowlands, J. T. Rowling, C. M. Ruben, A. J. Rundle, Christine E. Sandford, G. A. Sedee, S. Seed, J. D. F. Shaw, D. A. Sherman, C. Shiers, Christine M. Singer, C. J. Stevenson, W. M. B. Strangeways, G. S. Tapsall, T. Taylor, H. G. Thomas, Peggy Thomas, J. M. Thompson, B. T. R. Thornton, Phyllida M. M. Thornton, W. R. R. Thursfield, J. V. Thurston, M. Tobias, D. G. L. Trust, F. T. G. Tuffnell, J. C. L. Wade, R. J. Walsh, D. A. Watkins, Mary Weston, J. A. Wheeler-Bennett, L. R. Whittaker, G. H. Whittle, W. B. Whowell, J. B. Wild, C. B. Williams, R. L. Wills, W. H. D. Wince, D. L. Woolf, K. A. A. Wray, Joan D. Wrigley.

Diplomas

Diplomas in Child Health were granted, jointly with the Royal College of Surgeons of England, to the 35 successful candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of Oct. 27 (p. 588).

Diplomas in Ophthalmic Medicine and Surgery, in Medical Radiology, and in Physical Medicine were granted, jointly with the Royal College of Surgeons of England, to the following successful candidates:

OPHTHALMIC MEDICINE AND SURGERY.—D. Ainslie, F. J. Damato, A. J. Elliot, H. C. Kodilinye, J. M. Loftus, P. J. McNicholas, L. H. G. Moore, J. C. Mustardé, T. H. Negus, A. K. Pittman, D. Shorten, R. Vaughan-Jones.

MEDICAL RADIOLOGY.—R. A. Andrews, K. C. Falkner, R. M. Hall, T. M. Young.

PHYSICAL MEDICINE.—F. J. Bach, E. J. Crisp.

Medical Notes in Parliament

Bread and Nutrition

In the House of Lords on Oct. 24 Lord HANKEY moved that the health of the population should be the guiding principle governing the Government's nutritional policy, and that in the case of bread the health of the consumer should be the primary factor and milling and other interests should be developed in harmony with this policy. He said the debate on bread which had been initiated by Lord Teviot on Feb. 28 had aroused remarkable interest. The leading article on it in the *British Medical Journal* headed "The Political Loaf" [March 17, p. 372] had caused many a chuckle. Lord Teviot in that debate had secured an undertaking that if the Government had been found wrong in reducing the extraction of flour to 80% it would go back to 82½%. A second undertaking was that the Government would not reduce the rate below 80% until it was satisfied that this change would not be detrimental to nutrition. Lord Hankey said that in the subsequent eight months figures and facts had been published which suggested that the Government was wrong and ought to go back to 82½%, or better still to 85%. Figures supporting that contention were based on the seventh report of the Scientific Adviser's Division, Ministry of Food, checked by a memorandum on nutritive values of wartime foods which had been published by the Medical Research Council.

The present 80% flour showed no marked difference from the 85% flour of Lord Woolton in the figures for proteins, fats, carbohydrates, and calories. But the 85% flour contained a more valuable assortment of proteins, and their loss could not be stated in figures or corrected by enrichment or fortification. For the protective elements, which research had shown to be vital to health, the story was worse. The present 80% flour showed a loss of 10.2% in vitamin B compared with the 82% flour and 19.2% compared with the 85% flour; riboflavin showed a loss of 20% compared with last autumn's flour and 38½% compared with Lord Woolton's flour; nicotinic acid had a loss of 8.3% compared with the former but only 2½% compared with the latter. Iron in the present flour was reduced by 16½% compared with last autumn's flour and 21.7% compared with Lord Woolton's flour. That loss must be taken seriously because reduction in anaemia followed the introduction of the 85% flour. Other substances in wheat were removed progressively in passing from a whole wheat to a 75% flour. These unknown substances could be demonstrated by animal experiments to be nutritionally valuable. Obviously the millers could only put back what they knew they had taken out. Useful bran was also taken from the loaf. The 85% bread had been recommended all through the war as an optimum loaf by the Medical Research Council. The net result of the change involved the risk of an increase in anaemia, constipation, and consequential troubles.

A report on health and nutrition in the Channel Islands showed that the extraction level during the German occupation was practically 100% and that the great majority of people came to like the loaf. The medical profession of Jersey and Guernsey regretted its disappearance and its replacement by white bread when the relieving Forces arrived. While the 100% loaf was consumed the incidence of appendicitis, colds, and new cases of peptic ulcer was believed to have fallen considerably. In Jersey there had been no influenza epidemic. The first effect of the 100% loaf had been looseness of the bowels, sometimes severe, but after three months the symptoms abated and constipation, which before the occupation had been one of the commonest complaints, almost entirely disappeared. The investigators found nothing in Jersey approaching widespread undernutrition and were much impressed with the excellent condition of the teeth of the children. Lord Hankey added that vegetables had been unrationed and abundant during the occupation and were a staple food. Britain ought to go back to 82½ or 85%, and he asked the Government to publish the opinion of its scientific advisers.

NATURAL VITAMINS VERSUS SYNTHETIC

Lord HORDER, supporting the motion, said that since the debate on Feb. 28 a conference on the post-war loaf had been attended by representatives of the Ministry of Health, the Ministry of Agriculture, the Department of Health for Scotland, the Medical Research Council, the milling and baking industries, and flour importers. That conference agreed that three essential token nutrients could be specified as present in the wheat berry; that these could be assayed without difficulty and determined by the ordinary analyst; and that a minimum quantity of each of these should be present if bread was to remain the main contributory factor in the nation's health. Therefore the Government would have a basis on which it could make regulations requiring the minimum amounts of these substances to be present in flour, assuming that the Government decided to continue to regulate the character of flour.

The Chairman of the Food and Nutrition Board of the U.S.A. National Research Council reported that synthetic vitamins and vitamin concentrates were expedients which could not form the basis for a sound nutrition programme. The conference had left this question of the source of the token nutrients open for further research, but unanimously considered that in the meantime the Government should stick to the 80% extraction because it had coincided with such good health in the nation and could give the minimum quantities of the essential nutrients. Whether it did give them in the hands of a section of the milling industry could be judged only by analysis of bread obtained here and there in the country. There was no strict relation between the nutritive quality of flour and the extraction rate. Present knowledge of how these nutrients were distributed in the wheat grown was very recent, more of months than of years, but it had been confirmed. This knowledge permitted an improvement of milling to such an extent that they now knew at which part of the milling process the results should not be thrown away or even given to pigs and poultry. By the technique of milling they could direct into the flour the things they really required. The coarse fibre of bran could be diverted elsewhere and the loaf thereby made whiter and more acceptable to the average citizen.

Lord ADDISON agreed with the principle of the resolution that the health of the population should guide the nutritional policy of the Government. This country owed a debt to the Ministry of Food for emphasizing the importance of nutritional policy as underlying supply policy. The Government hoped

to keep the benefits which had already arisen from that policy. It accepted the necessity for continuance of the Ministry of Food. Bread was not the only food to which the Ministry of Food had added advantageous materials: margarine had been greatly improved. He hoped the country would become accustomed to regard the existence of a Ministry of Food, performing these and other functions, as an essential part of our national economy.

He accepted the suggestion that the Government should publish the report of the conference on the post-war loaf. When that was done the discussion could be conducted on a higher level because it had hitherto been encumbered by guesswork. He noticed from the report that riboflavin was decidedly less in quantity in the 80% extraction than in the higher extraction. That was not of itself an objection to the 80% flour, because riboflavin was normally taken in other foods. He was authorized by the Minister of Food to say that he would give every help in furthering the researches which the conference recommended. The conference had unanimously suggested that in the meantime the present national flour should be maintained with the improvements brought about by the latest improved methods of milling. The Government proposed to accept that recommendation.

Lord TEVIOT said that in the last few years many of the old-fashioned stone-grinding mills had applied for licences to start again, but only a very small number had been granted. There should be an opportunity for restarting these mills.

PUBLIC PREFERENCE ?

Lord GLENTANAR said he was assured by an expert that the extraction to-day was no higher than 78%. He suggested that millers and bakers should have every opportunity to supply wholemeal bread and that white flour should be provided in small quantities for special purposes, but rationed if necessary. Lord LLEWELLIN, speaking of the work done on the extraction rate of flour by the Cereals Research Station at St. Albans, said investigation there had proved that vitamin B_1 and most of the others were highly concentrated in part of the wheat germ, and that this fraction of the wheat could be segregated during milling to ensure that the great part of it went into the flour. When the extraction rate was reduced to 82½% there was a technical process in the mills to ensure that the necessary part of the germ reached the flour and did not go into the offal. It was no good towards the end of a war holding on too long to a kind of bread which the people did not like; a lot of manual workers were not enamoured of high-extraction flour. According to reports made to him when he was Minister of Food there had been an appreciable falling off in nutritional value when an 80% extraction was introduced, taking into account that other things besides bread were provided. Undoubtedly the 80% flour kept better, and the Royal Navy had insisted throughout the war on white flour for every ship commissioned for sea service. With the 85% extraction flour there had been a waste of bread.

Lord BLEDISLOE said he lived among miners and wondered whether the difficulties in securing adequate output of coal were not to some extent due to the fact that the miners preferred white bread and lean bacon. He affirmed that since the last debate on the subject in the House there had been no authoritative medical testimony in favour of a white loaf bereft of its protein, its fat, its iron, its calcium, and its vitamin B. It was the more necessary that bread should not be robbed because the present supply of whole milk was inadequate and would remain so for a considerable time.

The House agreed to Lord Hankey's motion.

Shortage of Nurses

On Oct. 25 Mr. BEVAN announced that according to returns submitted to Mr. Isaacs there were on June 30, 1945, vacancies for about 30,000 nurses of all grades in hospitals and allied institutions, including nursing homes, in Great Britain. He added that he was consulting the Minister of Labour and the organizations principally concerned on the whole nursing position and hoped to make a full statement in two or three weeks. Arrangements were being made whereby women who are willing and suitable to be trained for the nursing profession might be released from the Forces in Class B.

Earl WINTERTON asked the Minister of Health to reconsider the regulation whereby former V.A.D.s and auxiliary nurses wishing to qualify as State-registered nurses would be exempted only from six months of their four years' training. Mr. BEVAN replied that this was primarily a matter for the General Nursing Council, who decided after full consideration and discussion that the remission to be allowed in suitable cases should not exceed six months, thus reducing the minimum period of training from three to two and a half years. He had agreed to approve a rule to that effect.

Food of Diabetic and Tuberculous Persons.—Sir BEN SMITH said on Oct. 10 that he was advised that the present allowances of foodstuffs for diabetic and tuberculous patients were adequate for their needs. He could only allow them extra eggs at the expense of other members of the community, some of whom suffered from complaints for which eggs were a necessity. During the present general shortage of foodstuffs he could not provide diabetic and tuberculous patients with extra eggs prescribed for them by their own doctor.

Health Insurance Benefit.—On Oct. 11 Mr. BEECHMAN asked the Minister of National Insurance whether, in view of the delay before the passing into law of a comprehensive scheme of national insurance, he would forthwith introduce measures to bring the rate of sickness benefit into conformity with unemployment and other benefits, and extend to all cases of sickness provision for dependants. Mr. JAMES GRIFFITHS said that partial legislation on this matter in advance of the main insurance measure would be unsatisfactory. The Government intended so to frame the main legislation that the earliest practicable opportunity could be taken of bringing into effect, as part of a general plan, improvements in rates and conditions of health insurance benefit.

Mortality from Infectious Diseases.—Mr. BEVAN has furnished the following table for England and Wales:

Death Rates per Million living under the Age of 15 Years

Cause	1940	1941	1942	1943	1944*
Scarlet fever ..	12	11	9	11	9
Diphtheria	266	280	192	134	92
Whooping-cough ..	78	279	94	129	121
Measles	95	128	53	86	28

* Rates for 1944 are provisional.

Notes in Brief

The possibility of treating Service tuberculosis patients in Service hospitals or Service wings of civilian sanatoria is being examined with a view to minimizing any delay between diagnosis and the institution of appropriate treatment.

In the British zone in Germany the minimum food value of all displaced persons is 2,000 calories per person per day.

The Ministry of Supply is the wartime production authority for *x*-ray equipment and accessories. The post-war position is under consideration, and no consultations with the industry have yet taken place.

Dr. Summerskill, in reply to a question to the Minister of Food, said on Oct. 18 that existing arrangements for supplying dried bananas to patients with coeliac disease should not cause difficulty or delay.

Correction.—The statement on release of students in Medical Notes in Parliament (Oct. 27, p. 589) contains a misprint; students eligible for release in Class B are those in groups 1–49, and not 1–19 as stated.

Medical News

The Council of the Royal Society of Medicine proposes to create a Section of Endocrinology. The 50th anniversary of the discovery of *x* rays will be celebrated by the Section of Radiology at a meeting on Thursday, Nov. 8, at 4.30 p.m., under the chairmanship of Lord Horder, and, at 8 p.m., there will be a reception and entertainment.

Dr. J. M. Alston, pathologist to the Archway Group Laboratory (L.C.C.), will lecture on the scope of penicillin therapy to the Association of Austrian Doctors in Great Britain on Nov. 8 at 6 p.m., at 69, Greencroft Gardens, N.W.6 (near Finchley Road Station). Guests will be welcome.

The Food Education Society (29, Gordon Square, W.C.) has arranged a public lecture on "Food and Behaviour," to be given by Dr. E. A. Hamilton Pearson at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., on Thursday, Nov. 15, at 3 p.m.

A meeting of the Tuberculosis Association will be held at 26, Portland Place, W., on Friday, Nov. 16. Papers will be read, at 4.45 p.m., by Prof. G. Selby Wilson on "Bovine Infection and Disease" and, at 5.50 p.m., by Dr. Kalman Mann on "Incidence of Primary and Haematogenous Lung Lesions in Skeletal Tuberculosis." At 8 p.m. there will be a discussion on "Prognosis and Treatment of Combined Tuberculosis," to be opened by Dr. Harley Stevens, Mr. G. R. Girdlestone, and Dr. F. S. Hawkins.

A meeting of the Society of Public Analysts and Other Analytical Chemists will be held at the Chemical Society's rooms (Burlington House, Piccadilly, W.) on Wednesday, Nov. 7, at 6 p.m., when the following papers will be presented and discussed: "The Determination of Carotene and Vitamin A in Butter and Margarine," by Mr. T. W. Goodwin and Prof. R. A. Morton, and "A Photoelectric Method of Assaying Vitamin A in Margarine," by Messrs. J. L. Bowen, N. T. Gridgeman, and G. F. Longman.

Dr. John Scott Clark has been released from internment in Japanese hands.

David Paton Cuthbertson, M.D., D.Sc., has been appointed director of the Rowett Research Institute at Aberdeen in succession to Sir John Boyd Orr. Dr. Cuthbertson, who is Grieve Lecturer in physiological chemistry at Glasgow University, was educated at Glasgow and Leipzig Universities, and was previously lecturer in pathological biochemistry.

Prof. E. C. Dodds, M.D., F.R.S., director of the Courtauld Institute of Biochemistry at Middlesex Hospital and a member of the Grand Council of the British Empire Cancer Campaign, is visiting Norway, Sweden, Denmark, and Finland, under the auspices of the British Council, to lecture on cancer research and biological and medical subjects.

Field-Marshal Sir Bernard Montgomery, in an address to the Royal United Services Institution in London, has paid a high tribute to the medical organization of the Army, which, he said, had almost halved sickness among the troops compared with the war of 1914–18. As the B.L.A. swept through Germany, liberating prison camps such as Belsen, where thousands were dying of typhus, only 25 British troops contracted the disease, and none died of it. This was due to preventive inoculations and to the adequate supply of D.D.T. Through the use of penicillin many men who would have been permanent invalids after the last war were fit and ready to go back to the line within a month of being wounded. Doctors, the Field-Marshal said, were prepared to lay fifteen to one that once a man got into their hands, whatever his injury, they would save his life and restore him to health. It was a fine thing that these odds were achieved with a handsome margin.

Mr. Angus Rhodes, J.P., of Bradford, has generously founded a research scholarship to be associated with the Regional Radium Institute, Bradford. It is intended that the research should be of a clinical nature into an aspect of the cancer problem to be decided by the Trustees. These include the chairman of the Board of Management of the Bradford Royal Infirmary, the Town Clerk of Bradford, the donor and his solicitor, with the Medical Director of the Radium Institute as scientific adviser. The scholarship fund was established soon after the outbreak of war, but no scholar has yet been appointed. It is intended to advertise the post as soon as conditions permit, but in the meantime the Trustees feel that the existence of this scholarship might be of interest to medical practitioners both at home and in the Forces over-seas.

Dr. A. F. Foster-Carter has been appointed temporary medical superintendent of Brompton Hospital Sanatorium, Frimley.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* infectious diseases were more prevalent. The rises over the last week's totals included 166 for scarlet fever, 86 for diphtheria, 79 for measles, 79 for dysentery, and 61 for whooping-cough.

Diphtheria notifications equalled the greatest weekly total of the present year, the largest increases within the counties being as follows: Yorks West Riding 26, Lancashire 15, Glamorganshire 13, London 11. The rise in measles notifications suggests that the minimum level, after the epidemic which reached its maximum with 25,507 cases during the twelfth week of this year, has been passed. The rise was due mainly to London and the south-east and south-west, where altogether 58 more cases were notified than in the preceding week.

There were fresh outbreaks of dysentery in Kent (19), Staffordshire (17), and Durham (10). Lancashire recorded 55 more cases than last week, the chief centres of infection being Blackburn R.D. 48, Liverpool C.B. 24, and Manchester C.B. 12. The other large returns were London 40, Glamorganshire 18, Yorks North Riding 16, Surrey 14, Middlesex 11.

In *Scotland* there were 24 fewer notifications of dysentery, and 11 fewer of diphtheria, but 30 more of acute primary pneumonia, and 23 more of scarlet fever. Dysentery was less prevalent in the south-east and the west, but was more frequent in the other areas; the chief falls were in Glasgow, from 66 to 39, and Edinburgh, from 19 to 11.

In *Eire* there were 24 fewer cases of whooping-cough than last weeek, 9 fewer of diphtheria, and 8 fewer of diarrhoea and enteritis. Thirty-four of the 36 cases of whooping-cough, and 45 of the 54 cases of diarrhoea and enteritis, were notified in Dublin C.B.

In *Northern Ireland*, owing to sporadic cases, the notifications of diphtheria rose by 9.

Week Ending October 20

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,768, whooping-cough 1,087, diphtheria 604, measles 441, acute pneumonia 518, cerebrospinal fever 39, acute poliomyelitis 28, dysentery 284, paratyphoid 7, typhoid 5.

No. 4

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 13

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1945 (a)	(b)	(c)	(d)	(e)	1944 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	36	4	20	1	—	43	2	20	3	
Deaths		1	1				1	1		
Diphtheria	565	44	155	96	20	567	9	179	110	2
Deaths	10	—	1	—	—	6	—	—	1	
Dysentery	286	40	84	1	1	358	54	106	—	
Deaths				—	—				—	
Encephalitis lethargica, acute	1	—	—	—	—	1	—	2	—	
Deaths							—			
Erysipelas			37	8	—			54	6	
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				54					33	
Deaths	50	5	23	19	6	48	10	22	12	
Measles*	446	48	61	45	2	3,088	28	249	57	9
Deaths	—	—	1	—	—	3	1	—	—	
Ophthalmia neonatorum	61	6	10	—	—	64	2	18	—	
Deaths										
Paratyphoid fever	6	—	14 (B)	—	—	7	—	—	—	
Deaths	—	—	—	—	—	—	—	—	—	
Pneumonia, influenzal†	415	21	5	—	5	655	29	3	1	
Deaths (from influenza)	11	2	—	1	—	21	2	2	—	
Pneumonia, primary			151	15				190	9	
Deaths		25		4	3		33		14	
Polio-encephalitis, acute	3	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	45	2	1	2	—	24	1	6	5	
Deaths		—					—			
Puerperal fever		3	15		—		3	17		
Deaths										
Puerperal pyrexia‡	145	5	13	—	—	174	8	20	3	
Deaths		—					—			
Relapsing fever	—	—			—	—	—			
Deaths										
Scarlet fever	1,849	126	341	32	42	2,152	32	326	44	11
Deaths	1	—	—	—	—	—	—	—	—	
Smallpox	—	—	—	—	—	—	—	—	—	
Deaths				—	—				—	
Typhoid fever	10	2	2	7	—	9	1	4	15	9
Deaths	—	—	—	—	—	—	—	—	—	
Typhus fever	—	—	—	—	—	—	—	—	—	
Deaths				—	—				—	
Whooping-cough*	970	80	39		3	897	53	70	12	11
Deaths	3	1	—	2	—	6	—	1	—	
Deaths (0–1 year)	320	23	52	47	18	313	32	65	52	2
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,112	655	539	176	132	4,194	534	619	203	14
Annual death rate (per 1,000 persons living)			12·2	11·4	§			14·2	13·2	
Live births	6,865	879	869	424	289	6,640	454	1007	360	20
Annual rate per 1,000 persons living			17·4	27·4	§			20·5	23·4	
Stillbirths	206	26	23			215	14	29		
Rate per 1,000 total births (including stillborn)								28		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

§ Owing to movements of population, birth and death rates for Northern Ireland are still not available.

Letters, Notes, and Answers

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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ANY QUESTIONS?

Alcoholism

Q.—*A patient suffers from drinking bouts, which last for a month or so, and in the intervals between he does not touch alcohol. The condition is hereditary, and appears to follow the male or the female line in the family. The bout begins by someone asking the patient to have a drink; the patient thereafter takes to his own room, abandons all thought of work, refuses to see anyone, even his wife, refuses normal food and consumes only alcohol. After three to four weeks he becomes so "soaked" that he is physically unable to take as much alcohol as he would like and he slowly emerges from the bout and resumes a normal mode of life. Is there any treatment to prevent the onset of attacks, apart from rigid abstinence from alcohol? I can find no literature on this subject.*

A.—A distinction should be made between ordinary "drunkenness," persistent drinking because one wants to, and "alcoholism"—a term we may reserve for such attacks as the one described, which are usually compulsive in nature, recurrent and periodic and not persistent, and in which during the intervals the patient may be free from any desire for alcohol. A hidden physical predisposition is often present; cases in point being a mild duodenitis, producing the sense of craving, and a low blood sugar is another, the correction of which alone has been known to cure these cases. The toxicity of alcohol is also increased with a low B.P. On the psychological side such alcoholism must be regarded as a neurosis, and is an attempt to escape from life. It frequently occurs, therefore, in sensitive people (artistic and intellectual) who find adaptation to the world difficult. This may account for the "hereditary" aspect of the disorder. But the family history may also be due to transmission, not by heredity but by identification of the child with the parent—a very potent influence which we have known to cause alcoholism as it does other character traits good and bad. This may be the reason why in this case the alcoholism follows either the male or the female line, since the boy identifies himself with the father, the girl with her mother.

But the tendency to escape from life is not merely due to constitutional sensitiveness, but to early environmental conditions and a sense of insecurity in childhood, which again is more likely to occur if a parent is alcoholic. The question still remains why the need to escape takes the form of alcoholism. This may be accidental, but on analysis it is often found to date back to "oral eroticism," the resort to drinking indulged in, as in infancy at the breast, not merely as a sensuous pleasure but as a comfort and solace. In other words, it is a regression to infancy due to fixation and arrest of development. In these cases deep investigation by analysis into the unconscious causes may be necessary for a radical cure. But temporary (and sometimes permanent) cure may come about by reconditioning the alcoholism by giving the patient nothing but his favourite alcohol to drink, and an injection of apomorphine to make him sick after each drink; but complete abstinence from alcohol thereafter is necessary.

As for literature I may refer the questioner to Dr. Carver's article in the *British Journal of Inebriety* (July–October, 1945), and the references there mentioned.

Sulphonamide Allergy

Q.—*What are the explanation and treatment of skin sensitivity following the local application of the sulphonamide group of drugs, and revealing itself on exposure to sunlight?*

A.—The mechanism of drug allergy is conceived as follows. The drug, or a breakdown product of the drug, combines with protein in the tissues or body fluids to form a conjugated protein. The body treats this conjugated protein as if it were foreign protein and reacts to it by the formation of antibodies. The stage is thus set for an allergic reaction with any traces of sulphonamide-protein remaining in the tissues and whenever the patient comes in contact with the drug again.

The explanation of sensitivity to sunlight in sulphonamide-sensitive patients is more controversial. It has been suggested that porphyrins are formed as a result of the toxic action of the sulphonamide, and that they sensitize the skin of the patient to ultra-violet light, in the same way as it can be sensitized by other fluorescent substances, such as eosin. This seems unlikely owing to the long duration of photosensitivity. It is more probable that the antibody formed as a specific response to the sulphonamide-protein also reacts in a non-specific way with the altered protein produced by the action of ultra-violet rays on the skin. As both proteins are probably altered skin protein, they may well be antigenically very similar. In the same way a flare-up may occur at the site of a previous tuberculin reaction on exposure to ultra-violet light, or a dermatitis due to allergy to primula may flare up if the hands are repeatedly exposed to antiseptic solutions such as bichloride of mercury or phenol.

Desensitization of patients who suffer from skin sensitivity may be attempted by giving small doses of the relevant sulphonamide by mouth—e.g., 0.1 g. four-hourly, increasing it until a dose of 1.0 g. can be tolerated without reaction. The procedure is not free from risk and requires extremely careful supervision (cf. Tate, B. C., and Klorfajn, I., *Lancet*, 1944, **2**, 553).

Fat Atrophy and Insulin Injections

Q.—*I have been treating a diabetic with zinc-proteinate insulin. After about six months, during which she had remained practically sugar-free, it was found that at the sites of injection in the arms the tissues were disappearing, leaving a deforming concavity down to the bone. The insulin was changed to the ordinary variety A.B., but the atrophy of the tissues continued at other sites then used on the thighs. Can you advise me how this can be avoided?*

A.—The condition of fat atrophy which occurs at the site of the insulin injection is well known. It occurs in a small proportion of patients, and is due to some substance in the insulin solution to which the patient's tissues are sensitive. It is worth while trying whether one of the other two brands of insulin is less destructive to the subcutaneous tissues and, if so, using it. The protamine-zinc-insulins are no worse or better than the ordinary insulins for these patients. The best advice to give is to change the site of injection so that no one spot receives repeated injections. The front and sides of the thighs, the legs between the knee and ankle, the front of the abdomen and chest, the back, and the arms should all be used in turn. If this can be done the injury to the tissues will be much less and the subcutaneous tissues already damaged may slowly recover.

Nicotinic Acid for Chilblains

Q.—*I understand that favourable results in the prevention of chilblains have been claimed by the use of an intensive course of nicotinic acid taken early in the autumn—e.g., 450 mg. daily for 10 days. Is there any evidence for the claim, and, if so, what is the rationale?*

A.—I can see no rationale for the use of nicotinic acid for chilblains except that by causing flushing *temporarily* it improves the circulation. I should not expect the effect of taking an intensive course to be in any way lasting in this regard.

Infertility

Q.—*A female patient, aged 32, after having nine years' experience as a radiographer, became married eighteen months ago. When no conception had occurred after six months she submitted to an endometrial curettage. The pathological report was "anovular menstruation." Injections of serum gonadotrophin and chorionic gonadotrophin were prescribed, and five months later a second premenstrual endometrial curettage was performed. This time the report stated that secretory changes were occurring "in rather less than one-half of the cells." Gynaecological examination reveals no pathological condition other than a tendency to retroversion of the uterus. What are this woman's chances of becoming pregnant, and is her profession as a radiographer the possible cause of her sterility?*

A.—The facts indicate that during one menstrual cycle ovulation did not occur and that during another cycle, five months later, it did. It is hardly permissible to assume that anovular menstruation was a constant or frequent phenomenon before treatment, or that the gonadotrophin played any part in determining ovulation later.

It is quite impossible to give any sort of estimate of the chances for conception without knowing more of the case. Is there any information as to the fertility of the husband? Have other investigations—e.g., tubal patency tests—been carried out? Has the position

of the uterus been corrected for trial? On the evidence it seems hardly justifiable to conclude that the infertility is due to a failure of ovulation; all other possible causes will need to be excluded first. The varying response of different areas of the endometrium ("irregular ripening") is an interesting observation, but it is by no means uncommon. It might mean defective action on the part of the corpus luteum, or a variable sensitivity on the part of the endometrial cells. However, the fact that any secretory change occurred does indicate the presence of functional corpus luteum tissue at the time.

If it is established that menstruation is nearly always anovular in this case, then it must be admitted that exposure to *x* rays over a long period may have damaged the follicular apparatus. Such an effect, however, is not necessarily permanent. Moreover, it remains only a possibility, for anovular menstruation frequently occurs without any apparent cause, and the usual precautions adopted by *x*-ray workers give adequate protection to the ovaries. It might be added that minimal doses of *x* rays are *reputed* to be stimulating to the ovaries.

Little's Disease

Q.—*What is considered to be the cause of Little's disease, and what is the outlook for a patient suffering from the condition?*

A.—The answer to this question is provided by R. M. Stewart (*Proc. roy. Soc. Med.*, 1942–3, **34**, 25), whose paper includes a review of the relevant literature. Briefly, there is no single cause. The commonest abnormality is a prenatal primary degeneration of the cerebral neurones, for which there are probably many causes. The outlook depends upon the severity of the motor disability and the presence or absence of mental defect. When the motor disability is not too severe, and mental development is good, slow improvement may be expected during the first ten years of life, but considerable residual difficulty in walking is inevitable in all but the mildest cases.

Iron and Thrombosis

Q.—*Could administration of iron—e.g., as ferrous sulphate—precipitate or predispose to cerebral thrombosis? One patient treated with iron for about ten days suddenly developed aphasia. Another, who persisted in taking iron for many years in spite of absence of anaemia, developed hemiplegia. These cases may be coincidental.*

A.—There is no evidence that iron favours thrombosis. Cerebral accidents sometimes occur in patients with arterial disease and anaemia, when the anaemia is repaired by liver or iron. This is presumably due to an increase of blood pressure and blood viscosity as a result of the rise in the red cell count and total red cell volume, and not to the iron or liver *per se*.

Heredity in Cleft Palate, Hare-lip, and Spina Bifida

Q.—*Are spina bifida, cleft palate, and hare-lip hereditary? Are parents with spina bifida occulta likely to have children with spina bifida?*

A.—Cleft palate and hare-lip undoubtedly have a strongly hereditary basis, though the story is not a simple one. It seems clear that a recessive gene is responsible in the great majority of instances, but not all individuals who possess the requisite genetic constitution suffer from the abnormality. Additional influences have to play their part before the defect can become manifest. One of these additional factors is sex, for boys are more commonly affected than girls. What other factors are involved is not known; they may be genetic or non-genetic. It may be that the double dose of the recessive factor makes the developing embryo unduly sensitive at critical periods to what would otherwise be unimportant variations in uterine environment. Perhaps a quarter to half of those bearing the double dose of the recessive gene develop the condition; but this is largely a guess. It is likely that the recessive gene responsible is not always the same, and it has been shown that one gene pair, sometimes responsible, is partially sex-linked. This discovery is very interesting academically, and in practice means that males tend to transmit to more of their male than of their female relatives, and vice versa. It would also appear that the partially sex-linked cases are especially severely affected. Some pedigrees make it likely that sometimes, though very rarely, inheritance may be dominant. If so, the dominant gene also is one which does not always express itself, so that the skipping of a generation is common.

Spina bifida is genetically more obscure, perhaps because it has not been studied so systematically. The great variation in expression and the occurrence of spina bifida occulta are obvious difficulties as regards investigation. No doubt, however, heredity is involved; it has been thought to be recessive. If so, the union of two persons both of whom had spina bifida occulta would in all probability greatly increase the chances of frankly affected offspring in the next generation.

LETTERS, NOTES, ETC.

Venereology

Dr. ROBERT COOK (University College, Dundee) writes: I have followed with great interest the correspondence on the word "venereology" by Brig. T. E. Osmond (Oct. 20, p. 556) and Lieut.-Col. H. Richards (Sept. 22, p. 414). Looked at from a very broad point of view certain diseases are connected with "love," and hence association with the goddess Venus is not altogether inappropriate. To discountenance any suggestion of male prejudice we may remark that Eros has his name already in well-established adjectival usage. A study of Smith's admirable *Classical Dictionary* suggests the goddess in her primitive form—Astarte.

> "Where are they, Cotytto or Venus,
> Astarte or Ashtaroth, where?"

I suggest "astartic diseases" and "astartology." If a portmanteau word is wanted for a specialist in the three diseases, as a humble suggestion (constructive, I hope) why not the word "syphogossologist"?

Elongated Styloid Process Causing Symptoms in Throat

Mr. A. J. D'ABREU (Newtown, Waterford) writes: Early in February, 1926, a man aged 51 consulted me for discomfort on the left side of his neck and throat. On examination the left tonsil appeared large, globular in shape, and pushed out. Palpation revealed a bony structure, which could be traced by the finger towards the neck. It was slightly movable. Pre-operative diagnosis of the much-elongated styloid process of the temporal bone pressing on the tonsil was made. Under regional analgesia the tonsil was enucleated. The point of the styloid process was now easily felt. It was denuded of the fascia surrounding it, the process bared, and about an inch of it cut away with bone forceps. The chief difficulty of the operation was the huge tongue of the patient, who, however, was very co-operative, and the analgesia was perfect. No radiograph was then available; the other tonsil was also removed, but no styloid process was felt or any symptoms complained of on that side. Seen a few weeks afterwards, and again after some years, the patient was well pleased, for all symptoms had disappeared.

In Aid of the Grenfell Mission

In a year in which there will inevitably be many calls upon sympathy and generosity for the suffering in Europe we would nevertheless ask doctors to remember, even more generously than usual, the work of healing and of education and welfare that goes on continuously among the scattered poor population of Newfoundland and Labrador. The Grenfell Mission, whose hospitals and nursing stations in remote places are the only means of bringing help in times of distress to the people and whose schools provide the only education to be had by children in isolated settlements, needs funds urgently, and doctors can help by purchasing their Christmas cards from the Grenfell Association in this country. This year there are two attractive cards in colour, price 10d. each, a number in black and white, price 5d. each, and a pocket calendar, price 2d., postage extra. They may be obtained from the Grenfell Association at 66, Victoria Street, London, S.W.1, or at 21, Bothwell Street, Glasgow, C.2.

A Boarding School for Maladjusted Children

All who are concerned with the care of difficult and maladjusted children have recognized the need for hostels or (better) residential schools for some of such children where they can be not only taught but also treated by child-guidance experts. Among the problems of war evacuation was that of the care of "unmanageable" children, many of whom were orphans and backward. To meet this need the Friends Relief Services established a residential school at Chaigeley Manor. This was so successful that an effort is being made to continue the work in Cheshire in connexion with neighbouring child-guidance clinics. Although the new Education Act requires education authorities to make provision for maladjusted children, it is the custom in this country to leave the pioneer experimental work to voluntary effort, so that the best method may be discovered before the taxpayer shoulders the burden. Money is therefore needed to promote the Chaigeley venture, and we can be confident that the object is worthy of whole-hearted support. The address of the school is Thelwall, Lymm, Cheshire, and the office is at Friends' Meeting House, 6, Mount Street, Manchester, 2.

Messrs. H. K. LEWIS and Co. are considering the extension of their lending library to include foreign medical and scientific books. To obtain information about the desire for such books a short questionary has been prepared for circulation to subscribers and others likely to be interested. Those who would like a copy of the form may have one on applying to 136, Gower Street, London, W.C.1.